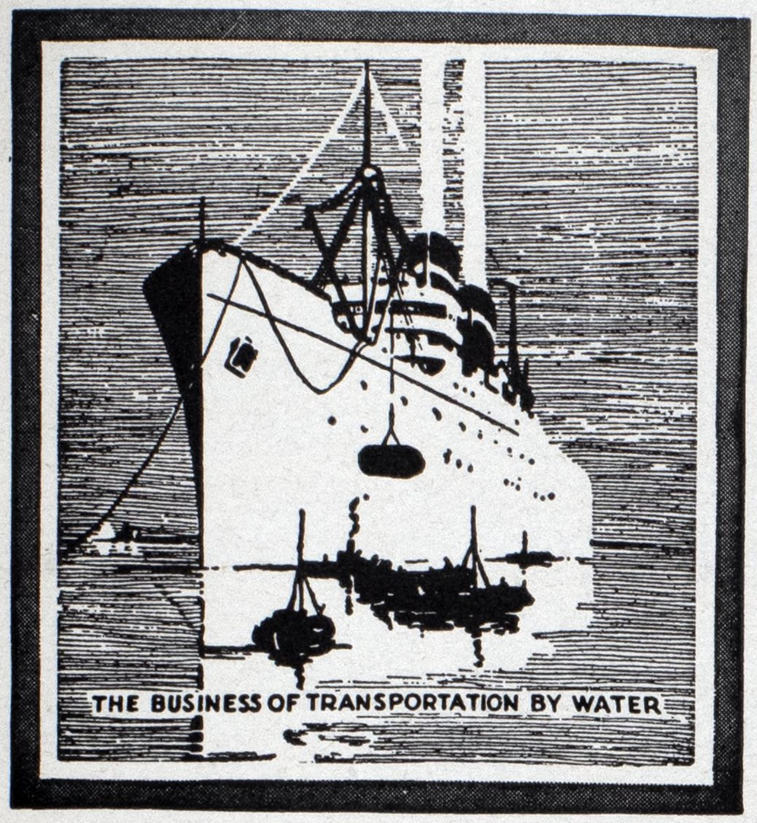
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The National Publication Covering the Business of Transportation by Water

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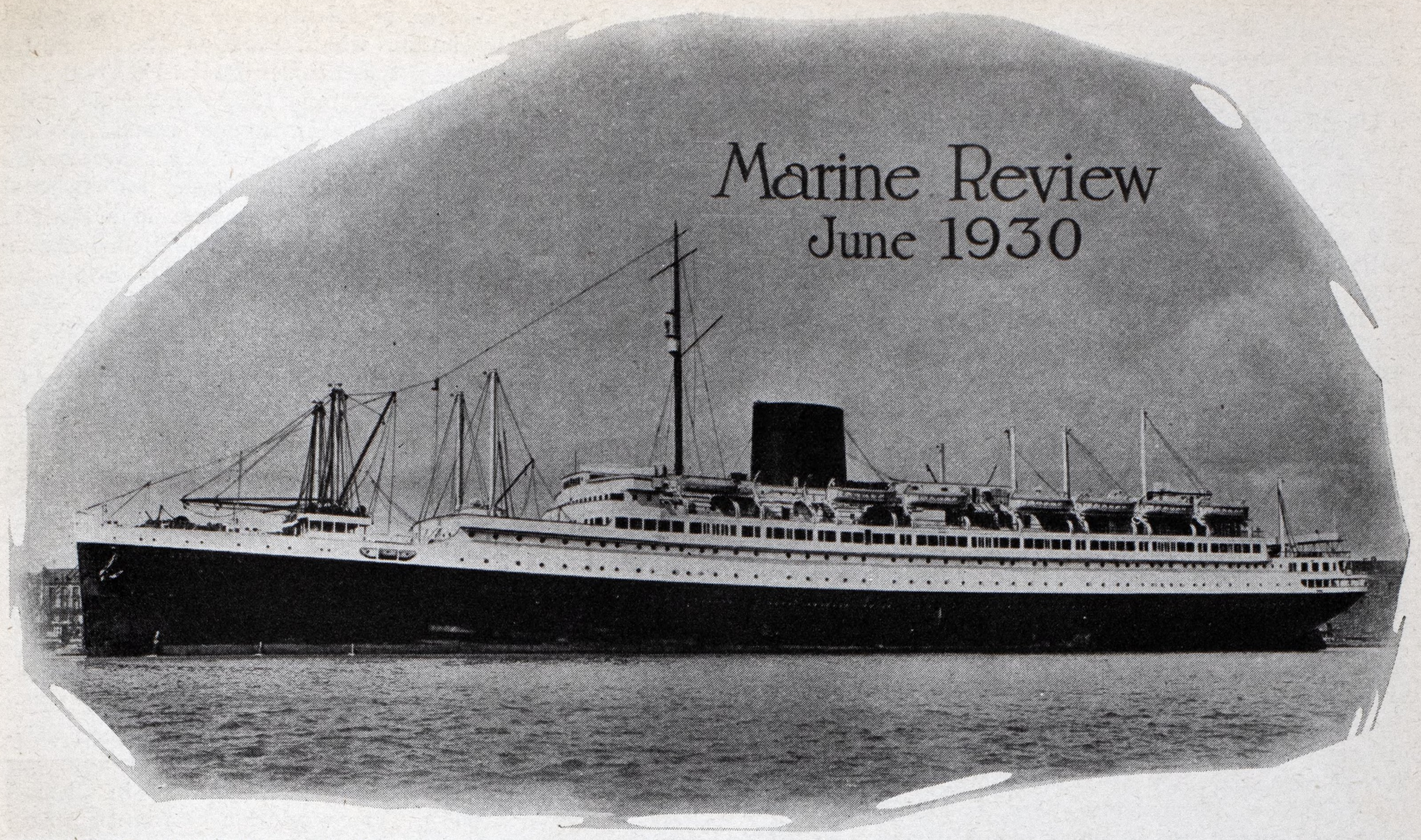
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New French Line Motorship Lafayette. Speed 18 Knots—22,000 Gross Tons,—Lenth 600 Feet, Beam 77 1-2 Feet, Draft 30 1-2 Feet Passengers, 591 Cabin, 334 Tourist, 142 Third Class—Sailed Havre May 17—Arrived New York May 26

Third Merchant Marine Conference Unites American Interests

By Lynne M. Lamm

Washington Correspondent for Marine Review

NEARLY 300 representatives of various branches of the shipping industry of the United States attended the third national conference on the merchant marine held at the chamber of commerce of the United States, Washington, on April 23 and 24. The conference, declared to have been the most successful yet held, was called on behalf of the United States shipping board by T. V. O'Connor, chairman who made an address of welcome and outlined the progress of the government's activities relating to shipping since the close of the war period. The chairman's address was published in full in the May issue of MARINE REVIEW.

Postmaster General Walter F. Brown, who, in his official capacity, is responsible for the award of ocean mail contracts provided in the Jones White law, brought the regrets of President Hoover that he found himself unable to appear personally at the conference and stated that the President has every desire that the administration shall co-operate fully with the shipping industry in rebuilding the merchant marine.

Under the provisions of the Jones-White law, General Brown said, postal contracts have been awarded which definitely require the construction of 57 vessels of 600,600 gross tons costing in the aggregate about $255,000,000. This, he said, will include two $30,000,000 ships for the Atlantic service of the United States lines, which ships are designed to be faster and in every respect equal or superior to any ships afloat. Additional mail contracts now up will increase this total to 64 vessels of 663,800 tons, costing $270,846,000.

Representative Arthur M. Free of California, a member of the house committee on merchant marine and fisheries, sounded a warning to the shipowners that they keep faith with congress and the shipping board in the conduct of the lines which they are operating with the aid of the Jones-White law. Justification for the Jones-White law, Mr. Free said, "lies solely in the extent to which it tends to equalize the cost of building and operating ships under the American

flag with those of foreign companies. The postal contracts were never intended as direct gifts to any shipping concern."

He declared that mistakes have been made since the act was passed. The first, he said, came shortly after it became law when the predecessor to Postmaster General Brown apparently failed to understand the purpose of the law and immediately entered into ocean mail contracts without requiring that new ships be constructed. The result is that today the bill is not as popular in congress as it was and "I feel that this dissatisfaction has resulted in the senate's acceptance of the McKellar resolution which will bring about an investigation of the shipping board and the post office department in their joint activities in its administration. It is up to you men," he said, "to get the companies who have received contracts without new construction requirements to build new tonnage to justify their receiving mail pay." If they don't, he declared, "congress is likely to get disgusted and simply fail to appropriate funds with which to make payments for the contracts."

Reports from committees appointed at the second conference held in January, 1929 were received and accepted. Four out of the eight committees submitted their reports. The first one, that concerning the reduction of differentials existing between shipbuilding costs here and abroad, was presented by H. G. Smith, vice president of the Bethlehem Shipbuilding Corp. and president of the National Council of American shipbuilders. He called attention to the need, in the report, for a limited number of standard sizes, speeds, and subdivisions, as well as standard types of auxiliary machinery for ships ordered in American shipyards. Such a program, Mr. Smith said, would enable the shipbuilders to offer lower costs of construction to the shipowners. He pointed out that with this as a basis to go on, it would be easy to gage the additional cost of special features to meet individual requirements.

Clinton L. Bardo, president of the New York Shipbuilding Co., endorsed the statements made by Mr. Smith and called attention to the progress which is already in sight in the general program of reconstructing American merchant fleets. As indicated by the postmaster-general, Mr. Bardo pointed out that the postal contracts negotiated to date will represent an annual expenditure of approximately $30,000,000. Guaranteed in these contracts is the construction of more than $300,000,000 worth of new ships which Mr. Bardo said he believes will be completed in the next five years.

How to Increase Patronage

THE report of the committee on methods of increasing patronage for American ships was presented by Frank C. Munson, president of the Munson Steamship lines, the committee chairman. This report recommended that the shipping board conduct a second set of hearings throughout the United States such as those held during the summer and fall of 1926. This report also recommended that in addition to its annual report to congress, the shipping board make quarterly reports to the President concerning the progress of American shipping affairs and that publicity be given to these reports. It recommended further, that the shipping board, shipowners and shipbuilders meet in semi-annual conferences with the President of the United States and that other conferences of international character be arranged to study mutual shipping problems with other nations.

The report of the committee on government aid to American ships not benefited by mail contracts was presented by H. B. Walker, president of the American Steamship Owners association, who served as the committee chairman. Mr. Walker's report pointed out that the merchant marine acts of 1920 and 1928 granted aid to the so-called tramp ships to a very limited extent, particularly in view of the fact that ships of this character are not eligible for mail contracts. The report recommended that steps be taken to aid tramp steamers in a measure equal to that given regular liners and suggested that a bill creating a merchant reserve fleet would bring this about. Such a fleet would consist, he said, of vessels divided into certain classes depending on their size and speed. The ships would be subject to requisition at any time in connection with naval maneuvers; and the shipping board would be authorized to enter into contracts for not more than ten years with vessel owners to enroll these ships with the navy department in the merchant reserve fleet and to grant them compensation in an amount not exceeding the differential existing between American and foreign costs of building and operating.

The report of the committee on marine insurance was offered by E. C. Plummer, vice chairman of the shipping board. It was offered in the form of a resolution to the effect that a permanent public committee consisting of seven members be created for the purpose of forming a common meeting ground between shippers, shipowners and underwriters for the purpose of adjusting difficulties and giving shippers a direct voice in all matters of mutual concern. The resolution also recommended that the association of marine underwriters of the United States should forthwith create a standing committee on liner classification.

Meeting Foreign Competition

THESE reports having been accepted the conference gave its attention to a discussion of the ship construction program under the Jones-White act. J. L. Ackerson, special expert of the bureau of construction of the shipping board; Homer L. Ferguson, president of the Newport News Shipbuilding & Dry Dock Co.; and H. G. Smith, president of the National Council of American Shipbuilders, were the speakers.

Franklin G. Mooney, president of the Atlantic Gulf & West Indies lines, presented the problems arising in attempts to preserve American direct trade. Mr. Mooney's company has been faced with competition from the British-owned Cunard line in the New York-Havana trade.

He pointed out that this company has no intention of maintaining regular service throughout the year but merely seeks to skim off the cream when it rises and leave the skimmed milk for the American companies regularly engaged in the traffic. In the recent construction activities of foreign companies operating in the North Atlantic trade, Mr. Mooney saw a new threat to companies engaged in trades similar to that between New York and Havana. Unless North Atlantic travel increases more rapidly in the future than it has during the past ten years, he said, there will be a growing surplus of moderate sized foreign transatlantic liners due to the construction of the giant liners which have been built and are being planned. The owners of this tonnage will seek trades in which they think they can be successfully used.

It is within the realm of possibility, and not at all improbable, that such competition may come to the operators of American shipping in other essential services. Our problem and that of the government is to devise ways and means of thwarting this unfair competition. Mr. Mooney then called attention to three bills introduced in congress by Representative Wallace White Jr., of Maine,

chairman of the house merchant marine and fisheries committee, which are designed to discourage foreign shipping companies from engaging in American trade which is not to or from ports of their own nationality and he asked the conference to endorse the bills which Mr. White has introduced. This endorsement was given through passage of a resolution offered by H. B. Walker.

Cargo Handling Efficiency

PROBLEMS of labor efficiency in cargo handling were discussed by Dr. Boris Stern, special agent of the department of labor, and Joseph P. Ryan, president of the International Longshoresmen's association. Dr. Stern called attention to what he described as unnecessary suspicion of the government on the part of employers, the union and the stevedore companies to such an extent that it makes it almost impossible on the part of such an impartial body as the United States bureau of labor statistics to procure the necessary data which might lead to a better understanding of conditions as they exist in the industry. Mr. Ryan, on the other hand, asserted that there is no particular suspicion of any body so far as the union is concerned and that he felt that in all instances where employers were working on agreements with the union all of their affairs were carried out with the friendliest feeling of co-operation. Mr. Ryan averred that in some instances such as that of the port of Lake Charles, Texas, the leading stevedoring company refuses to employ union men. The result has been that inefficient men are doing the work. The agreements for stevedoring work, he declared, bind the union to guarantee the efficiency of the men.

In connection with this subject, Chairman T. V. O'Connor of the shipping board, who presided at the conference, appointed a committee to study the problem of safety of marine workers. This committee will consist of Robert F. Hand, vice president of the Standard Shipping Co.; Frank C. Gregory, safety engineer, United States employees' compensation commission; S. D. McComb, George A. Marr, Admiral J. G. Tawresey, B. O. Pickard, R. J. Baker, J. A. Ryan, Victor A. Olander, and J. W. Magill. Both Mr. Hand and Mr. Gregory read papers on the subject of "Safety of Marine Workers."

Merchant Marine Officers

CAPT. J. F. Milliken, secretary-treasurer, Neptune association, discussed the training of merchant marine officers. He described the two methods by which men become officers, namely, through promotion and through graduation from one of the several nautical schools. Experience has shown, he said, that men who have had their preliminary training aboard ship generally make the best officers. Capt. B. B. Libby, of Washington, D. C., who also discussed this subject, suggested that a way to provide efficient training for merchant marine officers would be to enlarge the enrollment at the naval academy by adding one appointee to each state's quota and then assigning the surplus from each graduating class to merchant vessels.

A committee on training of merchant marine officers was appointed by Chairman O'Connor. Those appointed on this committee are as follows: Admiral H. I. Cone, H. B. Walker, James H. MacLafferty, George A. Marr, N. Sumner Myrick, Capt. B. B. Libby, C. W. Sanders, W. F. Yates, J. F. Milliken, Andrew Furuseth, Capt. J. M. Tomb, Robert C. Tuttle, and J. W. Magill.

In a discussion of inland water ways of the United States, Congressman S. Wallace Dempsey of New York, chairman of the house committee on rivers and harbors, urged the conference to endorse the plan for deepening the Erie canal so as to permit certain classes of ocean-going vessels to proceed directly from New York to Great Lake ports. On motion of H. B. Walker, the conference gave its endorsement to the measure. Dr. Roy S. MacElwee of Cambridge, Mass., also spoke on this subject and favored both the Erie canal project and the St. Lawrence water way plan which has been discussed for several years.

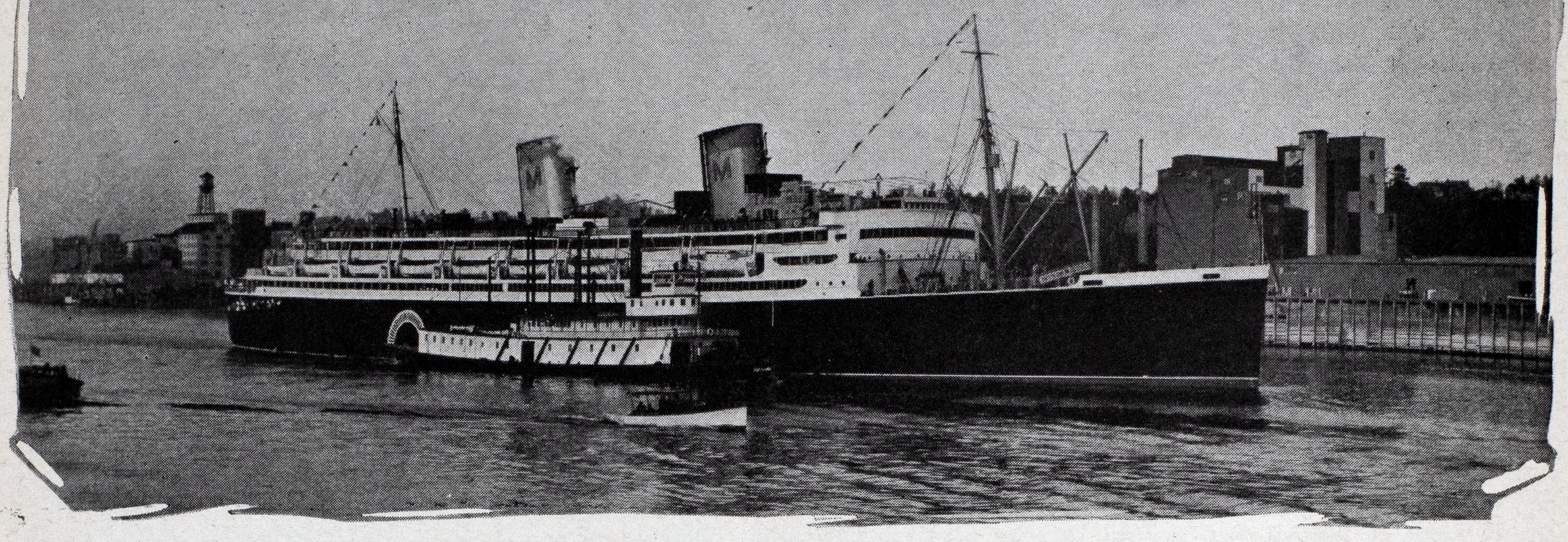
Safety at Sea Conference

The final speaker of the conference was Admiral J. G. Tawresey, who was the representative for the shipping board at the London conference on the safety of life at sea last year. In his address, Admiral Tawresey urged the conference to support the convention which was drawn up at the London meeting and Mr. Walker presented a resolution covering such endorsement. Objection to this resolution was raised by Mr. Furuseth who contended that the convention, if ratified by the United States, would work a hardship on American shipping and would have the effect of nullifying the seamen's act. The conference, however, adopted the resolution offered by Mr. Walker and adjourned, after having accomplished more in a practical way in real co-operation between the various interests than at any previous meeting.



Third National Conference on the Merchant Marine—Held at Washington, D. C., April 23 and 24, 1930

Portland Prepares for Expansion *of Foreign Commerce*



S. S. Malolo of the Matson Line Inaugurating a Direct Service From Portland to Hawaiian Islands

Attention Directed to Marine Activities Now Ranks as Third West Coast Port

By Phil Thurmond

RECOGNIZING the prominent place occupied by shipping within its borders today, and paying homage to the part played by water transportation in its growth in the past, Portland, Ore., has set aside June 28 for the celebration of its second annual Marine day, when citizens will visit the waterfront and inspect docks and ships there.

The port of Portland is located on both banks of the Willamette river, a few miles above the confluence of that river with the Columbia river. Like Philadelphia, New Orleans and many other great ports in other parts of the world, Portland is located inland, approximately 96 nautical miles from the Pacific ocean. The commercial ascendancy of Portland is based on this factor, the recognized economcial principle that water is the lowest cost per mile form of transportation, that therefore the modern trend in shipping is to extend the ocean haul and shorten the distance necessary to transport by land carriers.

Portland, like every other great port, is not in itself the final destination for cargo received, nor the actual point of origin for goods shipped over its piers. Its proximity to a productive and populous hinterland is a greater advantage than proximity to the open sea. Granting that port rivalry of today is a struggle for trade possession of the interior, ultimate victory must go to that port able to extend the head of ocean navigation nearest to the centers of industrial and agricultural production. Portland is doing just that.

Port For Great Territory

Ocean, inland water and rail transportation meet at Portland, known as the "gateway to the Inland empire." The "Inland empire" is the great basin of the Columbia river. This basin alone embraces the state of Idaho, part of Nevada, Wyoming, Utah and Montana, an enormous area in British Columbia and half of the states of Oregon and Washington—250,000 square miles of natural resources, all with water grade access to the fresh water harbor of Portland.

Within the harbor proper, the Willamette river ranges from 900 to 1600 feet in width, with approximately 27 miles of deep water frontage within the corporate limits of the city. More than seven miles of berthing space are available now at private and public terminals, grain, oil and lumber wharves, bunkers, elevators, drydocks and shipyards. New projects already under way will add materially to this total. A 35-foot low water depth exists practically throughout the harbor and dredges are at work extending this area. Tide fluctuation at Portland is small, never exceeding two feet—and that only at extreme low water stages. There is, therefore, no interference from this source to loading and discharge of ships. This is important for free movement of vessels.

The Columbia river entrance is one of the safest river harbor entrances in the world. A survey of the entrance, made by the United States engineers in May, 1929, shows a depth of 46 to 48 feet at mean lower low water for a width of 3500 feet and 40 feet for a width of 8000 feet. The survey of 1924 showed a channel depth at the mouth of but 45 feet at low water for a width of about 1200 feet and a depth of 40 feet for a width of 7000 feet. Comparison of the figures indicates that the scouring process due to jetty construction is self-sustaining and self-improving, and that the entrance depth will be 50 feet in a few years. A light ship,

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The author, Phil Thurmond, is assistant manager of the maritime commerce department of the Portland, Oreg., Chamber of Commerce. This article was prepared specially for MARINE REVIEW at the editor's request.

bell and gas buoys, and permanently lighted ranges furnish adequate markings for safe navigation. Fog hours at the entrance to the Columbia, reported for the period 1917 to 1929 inclusive, show the Columbia entrance has less than half the average at the entrance to San Francisco bay or Puget sound, according to the lighthouse service of the department of commerce.

The existing channel from Portland harbor to the sea calls for a 30-foot low water depth, a 300-foot width in straight courses and 500 to 600 feet in the turns. The beds of the Columbia and Willamette rivers unlike the Mississippi, are for the most part rock-ribbed and therefore permit only a proportionately small amount of silt and sand to be carried by these streams. Depth has been maintained and the width considerably increased in places with but a minimum of dredging due to the construction of permanent contraction dikes which virtually stabilize the channel. In anticipation of the trend in modern shipping toward construction of larger cargo carriers, a channel 35 feet deep and not less than 500 feet wide was recommended by the United States army engineers. Appropriations for this project, as recently passed by congress, cut the width to a 400-foot minimum, but a stiff fight is being waged to bring about adherence to the original specifications, and there is ample reason to anticipate success.

Undoubtedly the two greatest factors contributing to Portland's rapid strides in maritime commerce have been the port of Portland commission and the commission of public docks. Both of these public bodies have more than lived up to expectations, especially in preparing the port for future trade. The port of Portland commission, a quasi-municipal corporation, distinct from both city and county, has jurisdiction in the port over all harbor and channel maintenance, dredging, operating a harbor towage service and owning and operating the public drydocks and the municipal airport. The commission of public docks, a separate department of the city, has jurisdiction over all waterfront construction within the city limits, owns and operates three municipal terminals, the municipal grain elevator and other special facilities for the accommodation of port shipping.

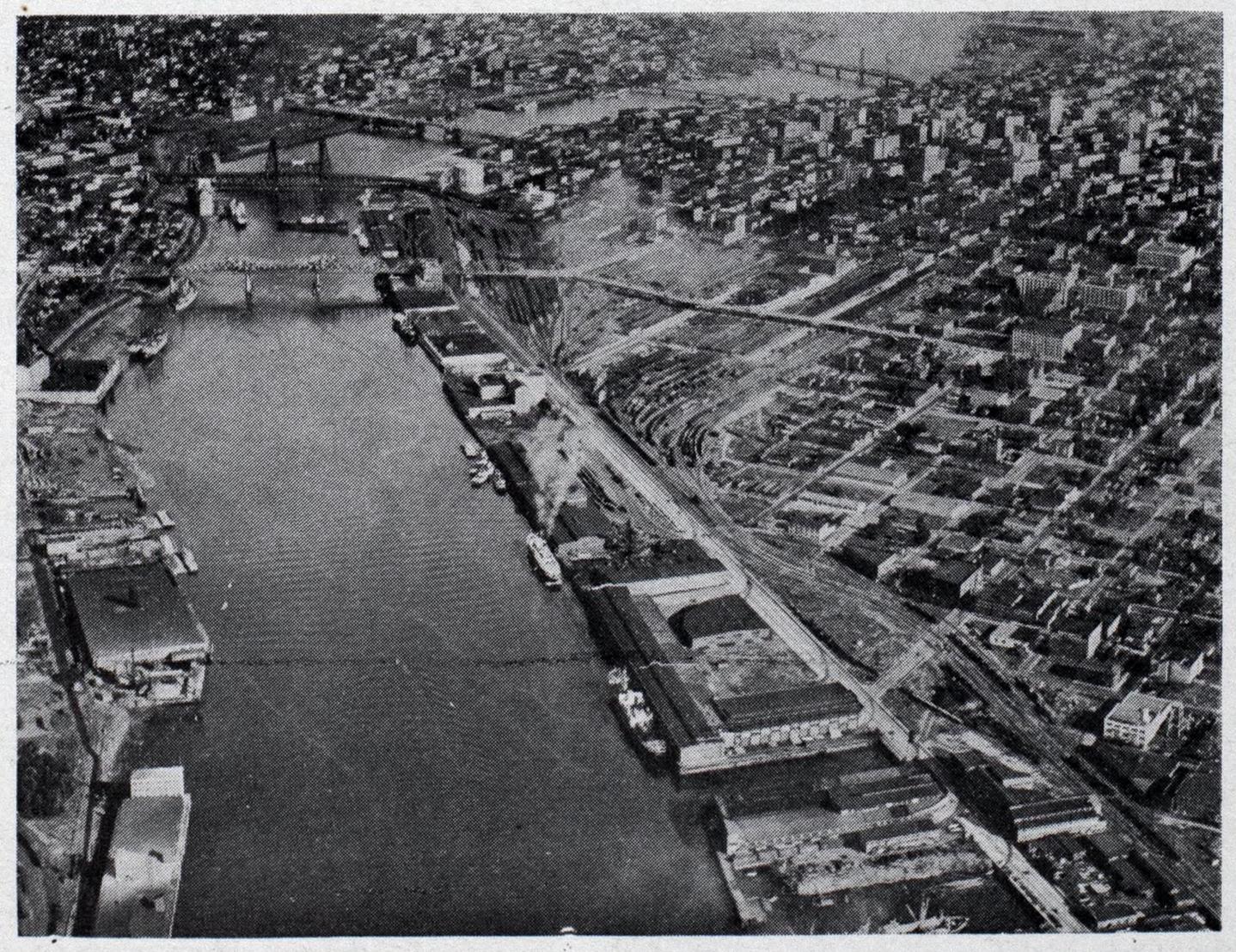
Importance as an Air Terminal

Geographical location at a strategic terminal point of rail and water has already favored Portland's advance. The same factor is counted on to place Portland in a commanding position in the latest mode of transportation—aviation. The great gorge of the Columbia furnishes the only safe air path through the Cascade range of mountains. Besides eliminating a high and dangerous climb, the Columbia river, in slashing its way through the Cascades, has formed at numerous places in its course great expanses of solid, level sand islands which offer ideal emergency landing fields for planes. The United States post office department gives official recognition to this fact by stipulating "Portland via the Columbia river gorge" routing in mail contracts covering the Seattle-Portland-Pasco-Salt Lake City flight. Ever looking to the future the port of Portland commission strengthened Portland's grip on air traffic of the Northwest by constructing the famous port of Portland airport. This was done by filling above high water level a 253-acre tract in the middle harbor, known formerly as Swan island, with material dredged from the channel. Because of its freedom from barriers of any sort, its modern conveniences and its proximity to the heart of the city, ten minutes drive by automobile, this airport is considered one of the finest in the nation by aviators who have had occasion to use it.

Some idea of shipping facilities offered at Portland may be had from a summary of the equipment at terminal No. 4, one of the group of three public docks operated by the commission of public docks. This terminal is located on the east bank of the Willamette in the extreme lower harbor and accommodates transpacific, transcontinental traffic, full cargoes of all traffic and the handling of all bulk commodities. The shed area is 586,360 square feet, open area 211,140 square feet. The working capacity of trackage is 425 cars but 800 cars can be accommodated. Equipment consists of two locomotive cranes of 15 and 25 tons capacity, switch engine, tractors, freight elevators, cargo masts, gravity and power conveyors, etc.

Three piers and a harbor extension provide approximately 5500 feet of berthing space, with three large transit sheds, one with two levels. An open wharf, 99,840 square feet in area, is used for uncovered storage. Concrete bunkers provide storage capacity for 10,000 tons of coal, concentrates, ore, phosphate rock and other bulk commodities. Equipment consists of unloading and handling facilities, conveyor belts, traveling ships' towers and box car unloader (car tipper). All machinery is electrically driven. Fourteen steel tanks at the terminal hold a maximum of 1,486,800 gallons of bulk vegetable oils and molasses. Equipment here consists of a heating plant, two 60-ton steel tank scales, electric pumps—including a two-stage turbine sinking type ship pump with capacity of 165 tons bulk oil per hour—compressed air and steam plant and facilities for barreling of bulking oil, loading and cleaning tank cars.

The cold storage plant is of hollow tile construction with standard insulation. The brine system is used and storage rooms are equipped with gravity conveyors. It has a capacity of 105,000 boxes of fresh apples. Adjoining this plant is a ventilated fruit warehouse which accommodates 250,000 boxes of apples. A reinforced concrete bulk grain elevator with storage capacity of 1,000,000 bushels will unload 15,000 bushels of bulk grain per hour from cars, and load on ships at the rate of 30,000 bushels per



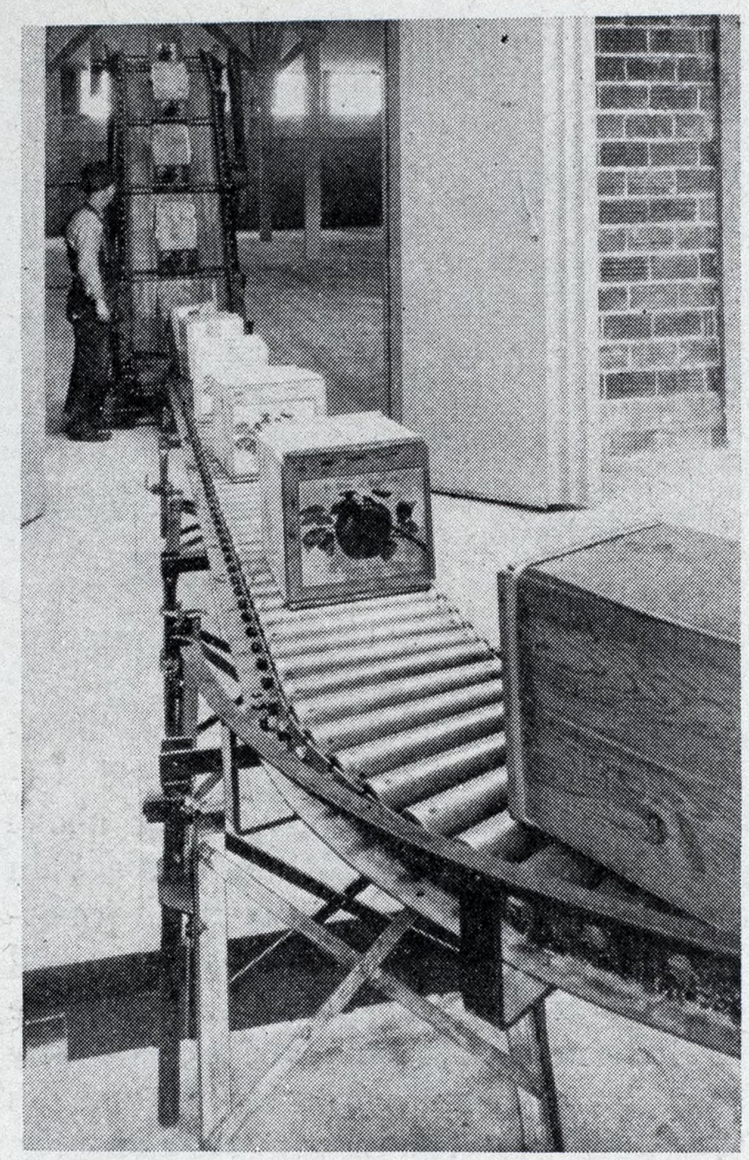
Upper Part of Lower Harbor, Portland—Most Deep Water Commerce is Carried on in Lower Harbor Below Bridges

hour. Equipment consists of five smutters, three separators, two double and two single cylinder washers, bulk power shovels, electric car pullers and dust collecting system. All machinery is electrically driven. Piling is being driven to increase the capacity of this elevator to two million bushels of bulk grain to accommodate this year's fall crop. A section of one pier is equipped with sacking out facilities, belt conveyors connecting with elevator and appliances for unloading, handling and cutting in sacked wheat. A two-belt shipping gallery connecting with the elevator extends the full length of this pier. It is equipped with four movable trippers and 12 loading spouts.

Future Expansion Provided For

Additional features of the terminal are an administration building, cafeteria, welfare building, track scales and an auto bus line connecting the terminal with city transportation lines. Federal and state bureaus represented include the grain inspection department of the state of Oregon, the federal grain inspection division of the department of agriculture, United States public health service quarantine station, United States customs service. In addition, the transcontinental rail lines maintain a joint railroad office, the Portland Merchants exchange has located its marine radio station at the terminal, and the same organization, acting as agent for the Western Union Telegraph Co., provides direct telegraph service for patrons of the terminal. A fumigation plant is operated as a private utility and the Terminal Flour mills operates a plant adjacent to the grain elevator. Capacity of the plant is 1500 barrels per day. Another company is now planning to lease space at the terminal for construction of a flour mill of 3000 to 4000 barrels daily output. In all, the terminal No. 4 site comprises a 211-acre tract to be used for future expansion.

The Portland Merchants exchange was organized in 1879 as a private venture and remained as such until 1924, when it was purchased by the various steamship companies, grain exporters and others interested in marine activities in the Columbia river area. In 1924 two departments were established—the grain division, which furnishes grain inspection for all cars received in Portland and establishes rules and regulations for each grain —the marine division, which receives and disseminates telegraphic information on the arrival of vessels at world ports and the movement of ships up and down the Columbia and Willamette rivers. In 1925 the Portland Dairy exchange was organized to make rules and regulations and establish prices on butter, eggs and cheese. The marine radio station KPK was organized in July, 1927, to handle radio communication from ship to shore and vice versa, thus enabling members to keep in closer touch with their ships. Last year, the Produce exchange was organized to deal with butter only. The statistical department of the Merchants exchange has been functioning since 1861. Figures on Portland commerce are furnished to the government, the city, the chamber of commerce and to business firms and universities.



Gravity and Power Conveyors Used at Portland in Handling Boxed Fruit

On April 30, 1929, Secretary Hyde of the department of agriculture, issued the final order designating the Portland Grain exchange as a contract or future market for wheat. This privilege was due Portland by virtue of its rank as the leading wheat shipping port of the Pacific coast and often the leader in the entire nation in this respect. Trading in grain futures under government supervision became an actuality when the exchange formally opened on the morning of June 19. Long before the close of 1929 the value of this market to brokers, exporters, millers and farmers became apparent. Free dealings between buyer and seller on the open market brought about a true relationship between the prices of different markets and adjusted prices to supply and demand.

Another progressive step was made by the port of Portland late last year when the commission of public docks, in conjunction with the Portland chamber of commerce, obtained the services of an eastern firm of experts to conduct a survey of water, rail and highway connections, uniformity in switching arrangements, consolidation of freight and passenger handling facilities, projection of a harbor belt line, location of the future industrial center, policies in relation to shipping, harbor and port improvements, trade expansion, raw material supplies, labor supply and wage scale, power, water and transportation rates and development of the resources of the hinterland. Portland is taking to heart the old admonition "know thyself" as it prepares for the great future that awaits the ports of the Pacific coast.

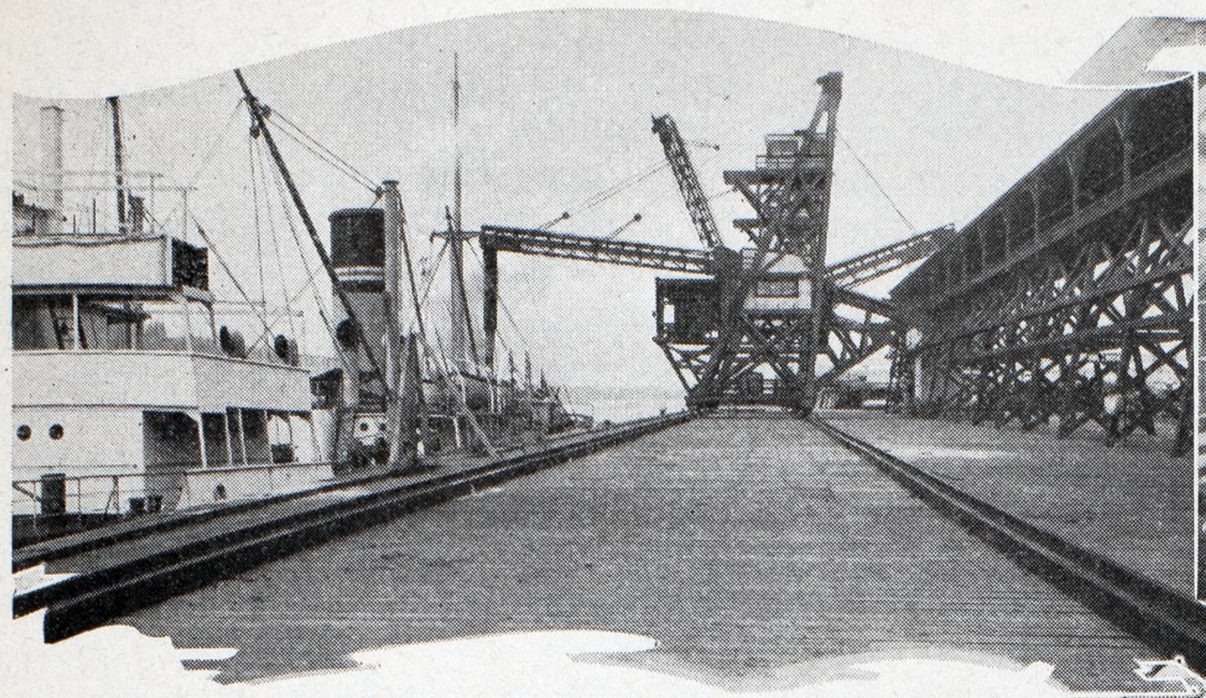
Becomes World Seaport

The history of the growth of Portland from a pioneer inland village to a world seaport shows an arm-in-arm advance with the history of the development of navigation on the Columbia river. Thirty-two years after the discovery of this famous "river of the west," as it was known to early explorers, the Columbia had already become the main artery of commerce for a large productive territory. Clipper ships risked the hazardous voyage around the Horn to carry produce of the Oregon country to markets of the world. By 1851, the year of its incorporation, Portland was beginning to take on the airs of a seaport, sending a large volume of grain by water to California. The home-owned vessel COLONA was dispatched in the China-Portland trade, and in 1868, the barque HELEN ANGIER took the first consignment of wheat direct from the Columbia river to Liverpool.

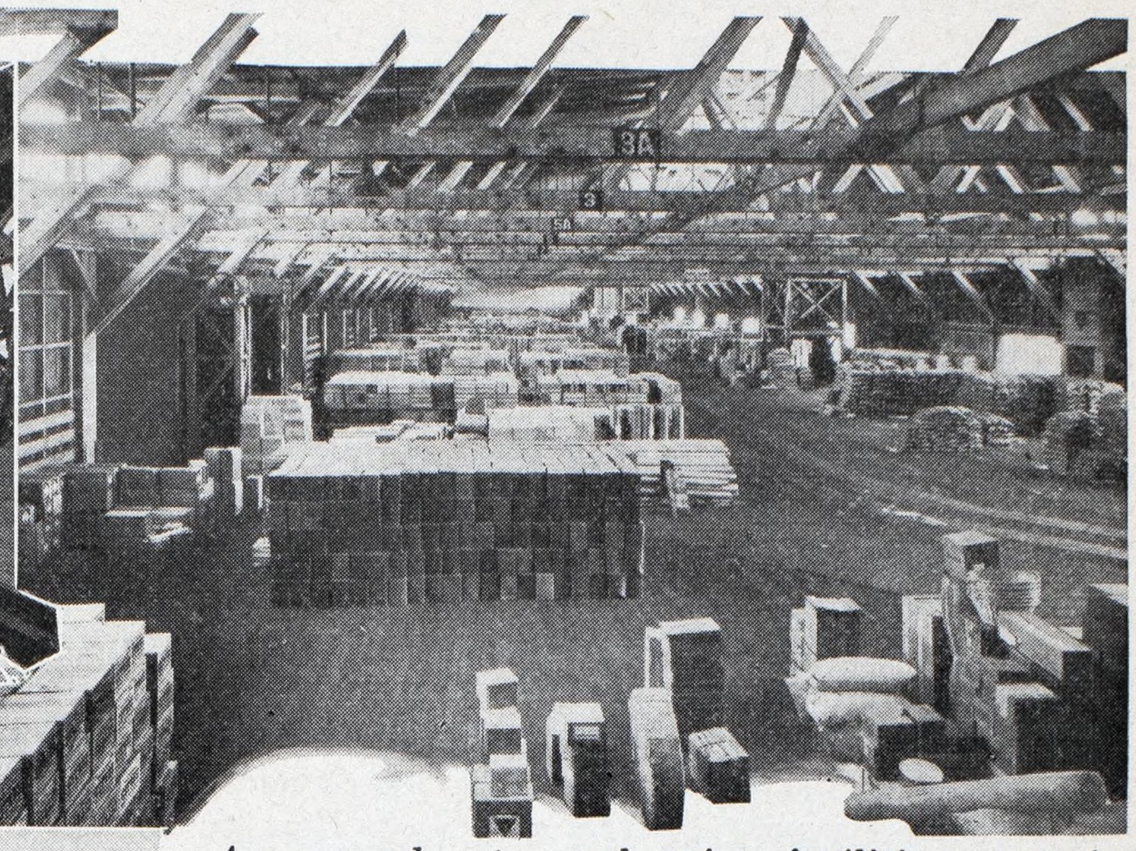
Today 60 steamship lines serve Portland for the most part on regular schedule. This number does not include the tanker services of the Associated, Richfield, Standard, Sunset Pacific, Union and Texas oil companies and the General Petroleum Corp., all of which operate large waterfront establishments in Portland harbor. The bulk of general cargo received and shipped is handled over eleven docks. There are nine docks with special equipment for handling grain and flour; five export grain elevators will have a bulk grain capacity of approximately four million bushels this fall, in addition to a considerable capacity for sacked grain storage. Seven docks are devoted exclusively to lumber.

The steady, solid advance of Portland's waterborne commerce in the last five years is indicated in the following figures on deep sea cargo tonnage. In 1925, the total ocean tonnage handled at Portland amounted

Terminal Facilities at Portland, Ore.



Above—Modern bunkering facilities in the harbor. Loading cranes

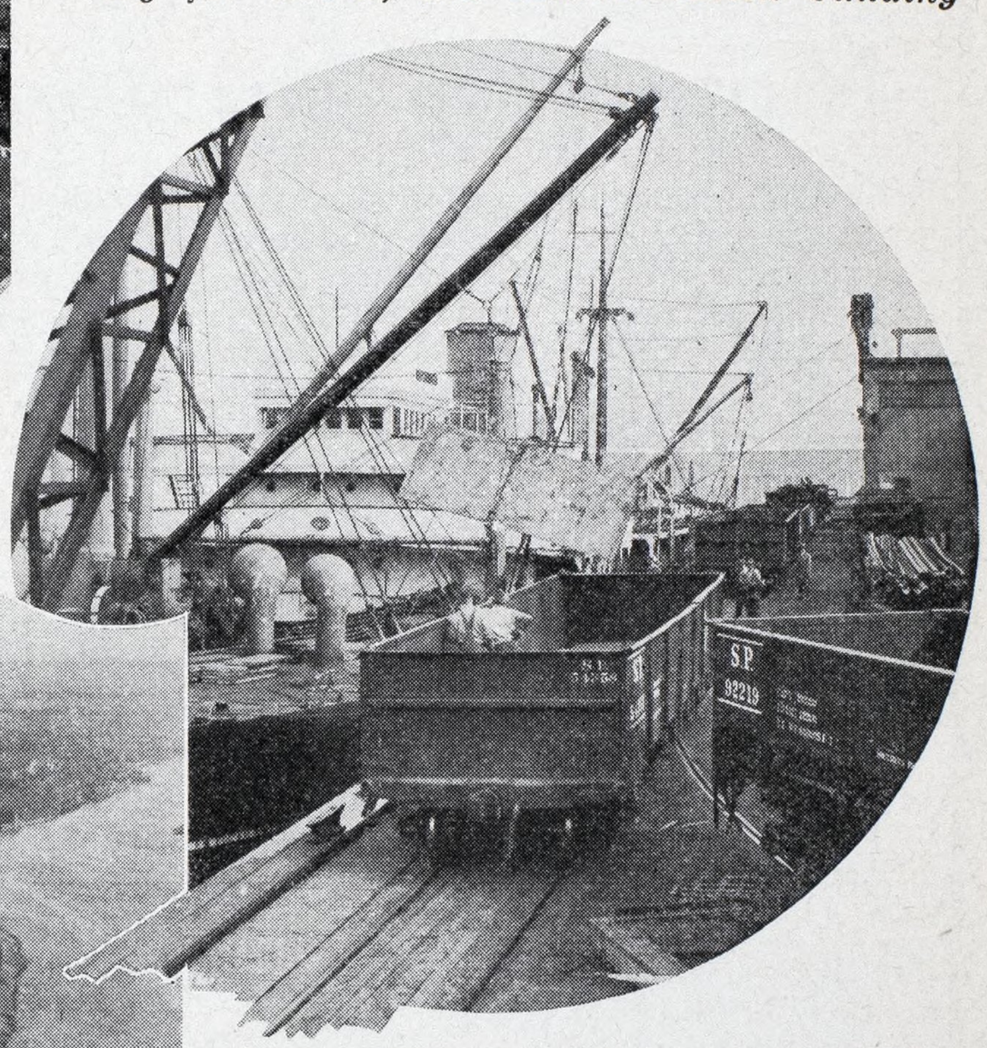


An example of warehousing facilities at docks

Left—Outboard view of municipal terminal No. 4 showing piers and slip, elevator, loading gallery for wheat, and administration building



Airport in central lower harbor. Auto road around airport. New administration building in foreground. No barriers of any sort



Above—Ship to rail facilities, unloading sheet iron from vessel to cars

Below—Direct transfer of lumber from railroad cars to vessel

Below — Municipal terminal No. 4 showing grain elevator, flour mill and storage warehouse



to 4,110,897, and this amount was boosted to 4,964,021 the following year; to 5,066,223 in 1927; 5,183,201 in 1928 and 5,344,273 last year. The value of ocean cargo also climbed steadily from $245,521,864 in 1925 to $309,227,390 last year. In addition to the foregoing "salt water" cargo is an almost equal amount of general merchandise and rafted logs which enter and leave Portland harbor in what is called local river commerce. Local or inland river tonnage in 1925 was 3,748,805, valued at $49,746,558. In 1929 this local tonnage had reached a total of 4,483,876, worth $45,325,072, less value but greater tonnage.

A recapitulation of the figures quoted will show that whereas Portland was doing a business of 7,859,702 tons worth $295,268,422 in 1925 in waterborne commerce, both salt and fresh water, five years later she had boosted this total almost two million tons to 9,828,149, valued at $354,552,462. In export tonnage, according to figures compiled by the United States shipping board, Portland was sixth ranking port in the United States and thirteenth port in total tonnage in the nation. There were 342 ship clearances from Portland in foreign trade in 1925; last year 650 ships cleared for foreign ports. Arrivals of ocean carriers in all trade in 1929 numbered 1929, a peculiar coincidence.

The last calendar year saw an astounding increase of 482 per cent over 1928 in foreign shipments of dried fruits from Portland. Foreign shipments of flour increased 40 per cent, of paper 35 per cent, of lumber 20 per cent. Foreign receipts of oil, cake and meals and sugar offset a corresponding decrease in receipts of foreign cement and hemp. Portland's largest foreign customer is the United Kingdom, followed closely by Japan and China. A prominent development in Portland's offshore commerce last year was the resumption of raw silk carrying from Japan and China. Raw silk received in transit to Eastern mills in 1929 was valued at more than ten million dollars.

Shipping companies have been quick to recognize the possibilities in the carrying trade out of Portland. Since January, 1929, nine new lines have been established here. Seventeen lines offer passenger service from Portland to foreign ports, in addition to two passenger lines to California. Should negotiations now underway in Washington, D. C. prove successful, Portland's home-owned States Steamship Co. will embark on a program of expansion that will call for the construction of some $16,500,000 worth of modern combination passenger and freight ships to serve in the transpacific and Atlantic Coast trade.

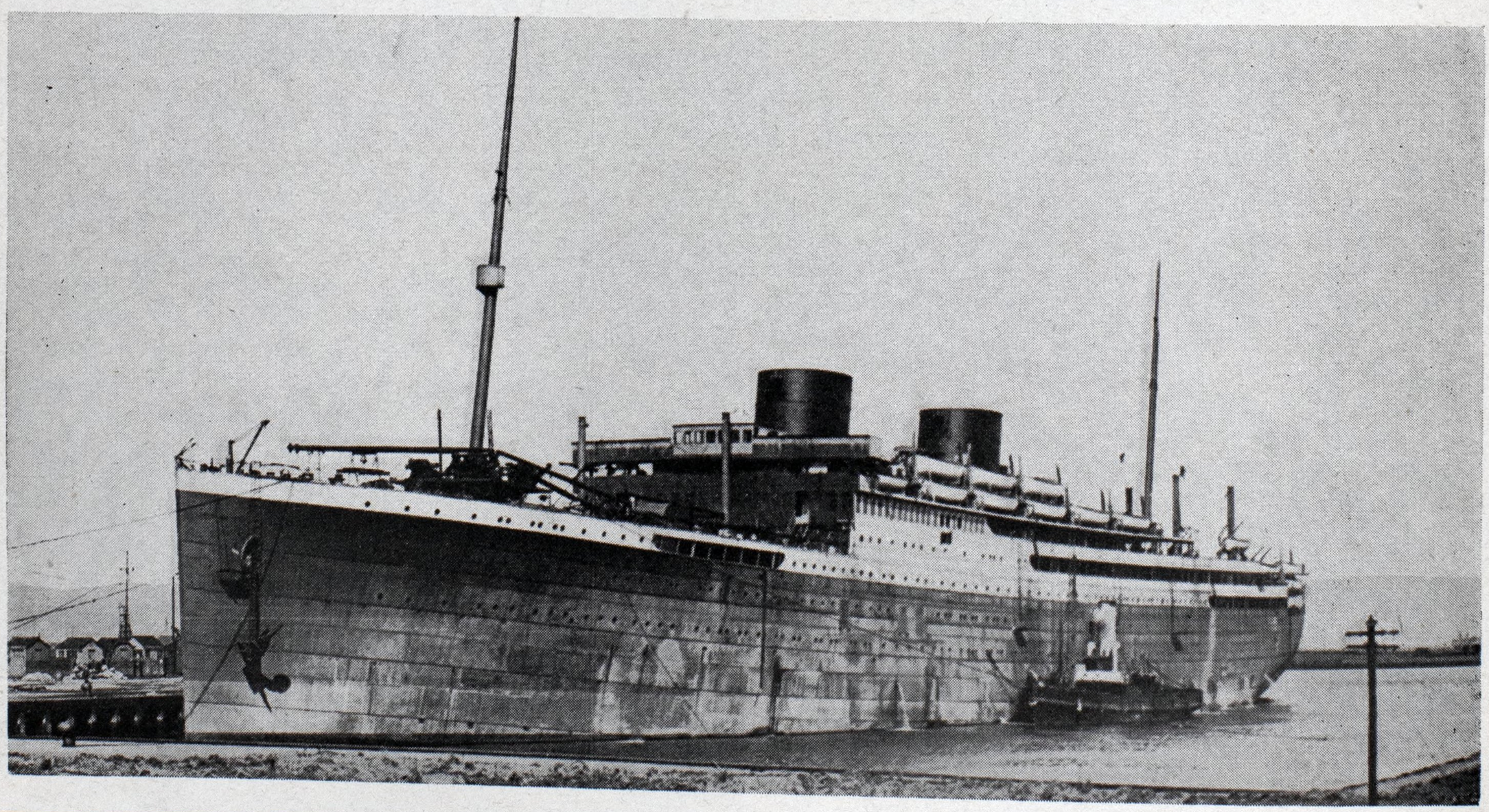
Motorship Britannic Soon to Enter Service

THE accompanying illustration shows the motorship BRITANNIC, new White Star liner outfitting at one of the wharfs of Harland and Wolff, Belfast. Builder's trials are to be held early in June. The new motor vessel, said to be the world's largest cabin liner, and Britain's largest motorship, is scheduled to enter the New York, Boston, Cobh, Liverpool service in June, sailing from Liverpool June 28 on her maiden voyage. The BRITANNIC is 680 feet long, 82 feet beam, 43 feet 9 inches in depth and of 27,840 gross tons. She is divided by watertight bulkheads into thirteen watertight compartments. A double bottom extends the entire length of the vessel. It is fitted for fresh water, water ballast and fuel oil.

Accommodations of the highest class are provided for 1550 passengers in cabin, tourist and third classes.

It is in her propelling machinery that the BRITANNIC is of special interest. There are two Harland and Wolff, Burmeister & Wain type, 10-cylinder, double acting, 4-cycle, diesel engines. Each engine will develop approximately 10,000 brake horsepower. In addition to the main engines there are four diesel generating sets, the engines being of the 6-cylinder trunk piston type. It is estimated that fuel consumption for the main engines on the BRITANNIC will be about 80 tons a day. The anticipated speed of the vessel is not known, but it is believed to be about 19 knots. The heat of the main diesel engine exhaust is used to generate steam at 100 pounds pressure in boilers also fitted to burn fuel oil.

The BRITANNIC represents the faith of Lord Kylsant in the economic value of the diesel engine even for large ships. Only time will tell the soundness of applying this type of power in such a comparatively large unit.



Floating Libraries for Seamen

Valued by Men Who Go to Sea—A Help in Preparation for Promotion—Benefits Both Men and Owners

By Mrs. Henry Howard

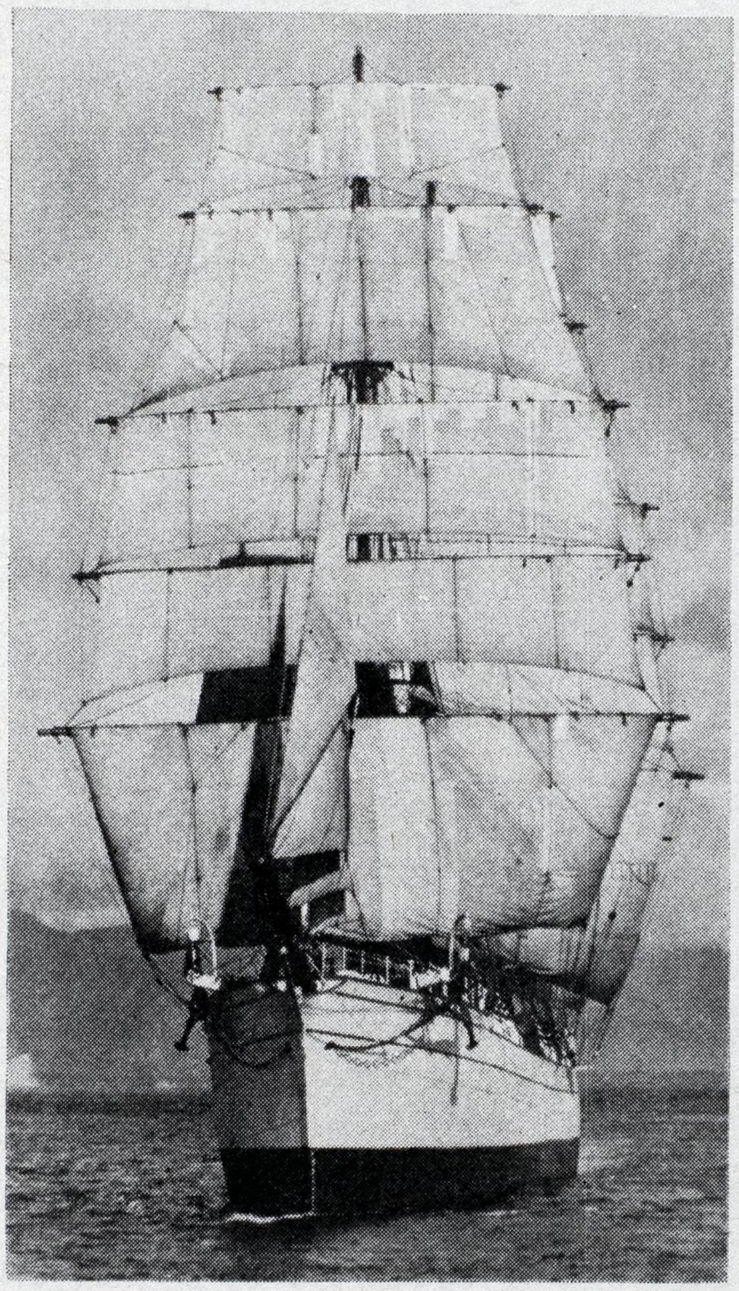
ENTERING its tenth year of continuous service the American Merchant Marine Library association, popularly known as the public library of the high seas, has steadily increased its activities in providing free reading matter for men who go to sea. The work consists solely in providing a crew's library for ships sailing under the American flag and for men serving in isolated lifesaving stations, lighthouses and lightships.

It exists because men who go to sea must forfeit the library privileges free to those on shore and yet these men have more time to read than the man ashore because in hours off duty they have few diversions. The association is directed by a national board of trustees of which President Hoover is honorary president and Chairman O'Connor of the shipping board is honorary vice president. It is the greatest traveling library in the world and is supported entirely by voluntary contributions from shipowners, the public and seamen. The headquarters' office, provided through the generosity of Frank C. Munson, is located at 67 Wall street, New York. There are offices and agencies in Baltimore, Boston, Galveston, Mobile, New Orleans, Philadelphia, Providence, San Francisco, Sault Ste. Marie, Seattle and Tampa. The office at Sault Ste. Marie never closes day or night or Sundays throughout the period of navigation from April 15 to Dec. 15.

More Books Read by Sailors

Over 340,000 books were kept in circulation during 1929, an increase of more than 34,000 over the previous year. In all, 1653 different ships, 73 lighthouses and lightships and 225 lifesaving stations were served by the library. More than 160,000 magazines were distributed. The total cost of this service was $57,000. This sum was contributed by 109 shipping companies, counting the shipping board and the Lake Carriers' association as one each, and by 6400 individuals, 4924 of whom were seamen whose voluntary contributions totaled $5741. The number of seamen contributing increased by 2000 over the year before.

It is interesting to note what other nations are doing in the way of library service for their merchant ships. England, through the Seafarers Education service, apparently founded after the American Merchant Marine Library association was organized, shows a record in April, 1929, of having given library service to 359 vessels. Funds for this service



Tusitala

were given principally by shipowners and no appeals were made to the public either for books or money. The English ships' library contained from 50 to 300 books, all of which were originally bought for this service.

Norway is the only other country to provide its seamen with books on any large scale. Traveling libraries have been used, but as Norwegian ships seldom come back to home ports, they find permanent ship libraries better suited to their needs. These are supplied at the rate of seven to ten volumes per man and are bound in washable material with different colors for each class. Books are chosen with the view to the countries likely to be visited by the ship. There are now libraries on 90 per cent of Norwegian ships and the average annual loans are 1000 volumes per ship. The report does not state how this Norwegian service is supported.

The cost of the American service is low. Much valuable help is given free. A small grant of money from the Carnegie Corp. has enabled the association to buy an extra supply of educational books, especially those pertaining to the business of the ship. Posters have been placed on many ships sailing from New York to make it known to the men on board that books to meet their special requests can be supplied. All seamen on American ships are offered free books on seamanship, stowage of cargo, navigation, marine engineering, radio, cooking, elementary and advanced books on mathematics.

Helping to Carry on Work

At the request of the surgeon general of the United States public health service, special literature provided by this service is placed in the hands of men on board ship.

Undoubtedly this association is helpful to the merchant marine in building up an interest in the sea and in the ships in communities removed from the shore. This is illustrated in the work at schools where teachers and children are greatly interested in what they are told of our merchant marine. In this way the message on the merchant marine is far reaching and helps to make people shipminded.

That this service is valued and appreciated by seamen is indicated by the letters received, making special requests for books and always with a message of thanks and appreciation. The shipowners are showing a steadily growing interest and are giving greater and greater support to this work.

William McFee, in his article about the work of the American Merchant Marine Library association in the April number of *World's Work* has well said in the closing paragraph—"It ought to be, when you think it over, as unusual for a ship to sail without a library as for a town on shore to live without one."

This article is an abstract of the address delivered by Mrs. Henry Howard, president of the American Merchant Marine Library association, at the Third National Conference on the Merchant Marine held in Washington, April 23 and 24.

Repairing the Leviathan

By C. A. McAllister

THE LEVIATHAN, pride of the American merchant marine and flagship of the United States lines, during a succession of heavy gales in the North Atlantic last fall, suffered serious damage to her shell plating and strength deck as the result of heavy head seas and what was apparently an oversight in the original design of the ship as viewed with more recent knowledge on the subject. This damage was almost identical in extent with a similar misfortune which befell another transatlantic vessel, sharing with the LEVIATHAN the oftimes disputed distinction of being the largest ship afloat. As is usual in the winter season, the LEVIATHAN was withdrawn from active service for various repairs, improvements, and renovations to both hull and machinery, including the removal and replacement of the damaged strength plating, the contract for which was awarded to the United Dry Docks.

Hydraulic Riveting is Required

In order to make proper restitution of the damaged strength members, the American Bureau required that hydraulic riveting be used wherever possible in connection with the shell plating. This method of riveting is a comparatively simple matter in new construction because the driving may be done progressively upwards and the necessary head room is therefore always available. The usual type of hydraulic bull riveter sufficiently sturdy, however, to resist the 75 tons pressure considered necessary properly to drive these rivets is of excessive proportions and weighs approximately 20 tons. With great difficulty one was located in Philadelphia and delivered at the dock in Hoboken. After it was received, it was found practically impossible to handle such cumbersome rig as it could not have been employed unless the interior of scores of costly staterooms were demolished, many shell plates removed and decks cut at the hull to provide the necessary clearance and head room. This repair of the LEVIATHAN was unique because the location of the damage presented a problem never before encountered in the Port of New York. It involved the driving of 3000 rivets ranging from 1¼ to 1½ inches in diameter on the side of the ship many feet above the water and in mid-winter conditions of temperature.

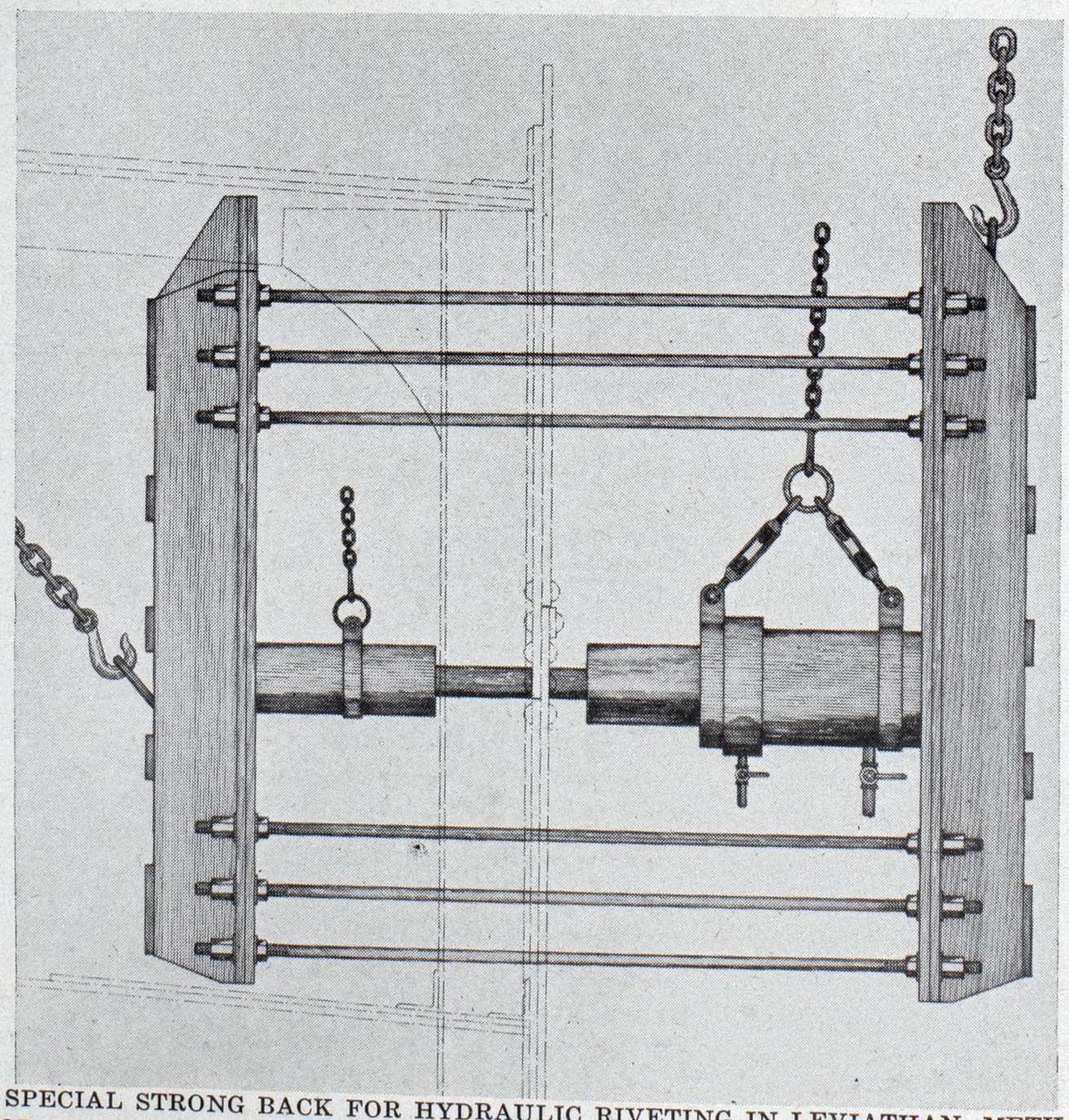
PERFORMANCE in service is always the acid test of the work of the designer and builder. In going to the LEVIATHAN *class of liners* 18 *years ago the Germans went considerably beyond the size of the largest vessels up to that time. The performance, all told, of the three ships of this class is very creditable. Service has demonstrated, as it always will, the desirability of certain changes. In this way the art of an industry is advanced and the world benefits.*

After it was determined that the portable bull riveter would be practically impossible to use, a typical exhibition of American ingenuity and resourcefulness was brought to bear. George H. Bates, vice president of the United Dry Docks Inc., invented what may be termed a strongback hydraulic bull riveter. There was a great deal of discussion among the many people interested as to whether this apparatus would successfully do the work. It was, therefore, first set up in the shops of the makers, the Staten Island plant of United Dry Docks Inc., and specimen rivets driven simulating in every way the work to be done on the vessel. Before any work was done, these specimen rivets and plates were cut in two, when it was found that remarkably fine riveting was done by this new device. The holes were filled out the entire length and the heads were perfect. It was then decided to begin the work.

Developing an Ingenious Method

The machine consists of two strong back members, each built up of double 1¼ inch thick plates 8 feet 8 inches long by 6 feet 8 inches wide welded together to form a 2½-inch face plate which was reinforced by several 10 inch by ¾ inch thick vertical and horizontal stiffening webs welded to the back of the face plate and to each other. These strong backs were so designed that one unit could be placed inside the ship's hull and the other outside and both held together by 12 chrome nickel steel tie rods each 1½ inch in diameter run through frame rivet holes in the shell. Thus the strong backs served as braces for the hydraulic heads which were similar to those used on the standard bull riveter and being connected through the side shell absorbed all of the pressure exerted by the hydraulic rams. The hydraulic heads were arranged to be portable and were suspended between the strong backs or each side of the shell by means of block and tackle, so that it was possible

The author, Capt. C. A. McAllister, is president of the American Bureau of Shipping. The repair work described was done to the requirements and under the supervision of the American Bureau.



SPECIAL STRONG BACK FOR HYDRAULIC RIVETING IN LEVIATHAN. METHOD SUGGESTED BY GEO. H. BATES, VICE PRESIDENT, UNITED DRY DOCKS

to drive approximately 200 rivets over a width of two frame spaces and nearly a full 'tween deck height without changing the position of the strong backs. Two complete sets of strong backs were constructed, so that while one was in operation the second could be set up in a new position ready for driving. Each set weighed 8½ tons and required the erection of a special means for handling from overhead on the vessel's topsides because of the fact that any suspension from a derrick on the pier would be affected by changing elevation due to tidal rise and fall.

Both Shell and Deck Plates

For operation of the hydraulic heads the usual auxilary equipment such as accumulators, pumps, and piping was erected on the pier, and because of the cold weather during which the work was carried out a special anti-freeze solution was required to maintain the equipment in working order. Special goose neck dies were also made to facilitate the driving of rivets through frames and cramped quarters.

In all six shell plates and 44 deck plates were involved in the repair operation. Five of the shell plates about the number one starboard expansion joint, in the main sheer strake and two strakes below were damaged, but it was necessary to remove a sixth plate because of the arrangement of butt straps. These plates were 33 feet long by 78 inches wide and ranged in thickness from 1.10 inches to 1.36 inches. It was in these plates and their quadruple riveted butt straps that the strong back drove 3000 rivets, through varying thickness up to 4½ inches.

Adding Strength to Structure

On C deck at the number one expansion joint one stringer and doubler and one plate and doubler in A and B strakes were renewed. The damaged stringers were 33 feet long by 73 inches wide and 1⅛ inches thick, but in the new stringers the thickness was increased to 1½ inches. A and B strake plates and doublers were renewed as before, being 33 feet long by ¾-inch thick and ranging in width from 61 to 80 inches.

To give the deck additional strength at this point two trebler plates were installed, one at the outboard after corner and one at the inboard after corner of the starboard uptake casing. At these corners the casing was cut away at the deck level to permit the trebler and strake plates to extend into the uptake opening and be tapered at an angle. The new treblers are 7 feet square and one inch thick. To increase the strength of the stringers and doublers, 15 shell frames were cut at the C deck level, thus eliminating the necessity of notching these plates in way of the frames. To compensate for the cutting of the shell frames, a continuous gusset plate 30 inches wide by ⅝ inch thick was installed for a distance of 48 feet on the inboard toe of the frames and fastened to the frames with six inch angle clips ½ inch thick, and to the deck with a six inch, ⅝ inch thick angle for a distance of 48 feet.

A new continuous stringer angle bar 8 by 8 inches by ¾ inch thick was installed for a distance of 57 feet and a new bounding bar angle was installed along the after end of the uptake casing and continued forward



GEORGE H. BATES
Vice President, United Dry Docks Inc.

on the outboard side for 15 feet. All new treble and quadruple riveted butt straps ¾ inch thick were installed, above and below each plate butt.

Renewing Plates in Way of Fracture

On the port side in the region of the number one expansion joint similar repairs were effected on the C deck, including the stringer and doubler, which while not damaged were nevertheless renewed.

On D deck, starboard side, one cracked stringer and one cracked doubler plate were renewed. The stringer plate was 33 feet long by 70 inches wide and 1.04 inches thick and the doubler 33 feet by 64 inches by .82 inch. A new waterway angle bar 6 by 6 inches by ⅝ inch thick was installed at this point for a distance of 30 feet.

At the number two expansion joint on C deck, starboard side, outboard of the uptake casing, several cracked plates and doublers were renewed. Other plates were renewed about the starboard elevator trunk, where an additional trebler plate was installed. To further strengthen the deck in the region of the uptake casing and elevator trunk, a number of doublers and treblers were put down and new bounding angle bars 6 by 6 inches by ⅝ inch thick were installed. Similar repairs were carried out on the port side of C deck.

Extensive Dismantling Necessary

The immensity of the reconditioning is emphasized by the fact that to get at the shell and deck steel work, it was necessary to dismantle 68 staterooms, 18 bathrooms and 13 lavatories on C, D and E decks, and remove and renew 10,000 square feet of asbestolith decking 6000 square feet of linoleum tile, 400 square feet of rubber tile and 600 square feet of vitreous tile. The entire electrical system of the affected area was torn out and renewed, as well as the ventilating system, telephone lines, aero fire alarm system, plumbing and heating equipment.

The amount of new steel installed totalled 393,500 pounds of boiler shell plate requirements, i.e., of 60,000 to 70,000 pounds of tensile strength. The 6000 rivets used, half of them in the shell plates, ranged from one inch in diameter and 2¼ inches long to 1½ inches diameter and 10 inches long (ordered dimensions) and weighed 25,700 pounds.

Work Continued Night and Day

This repair work was continued night and day and an American Bureau surveyor was constantly in attendance. Each rivet as driven was inspected and either passed or cut out and redriven, because it would have involved a great deal of expense to put back in place the bull riveter for re-driving after it had finished the work in each area. The work was completed within the specified time and as it stands, represents a highly creditable performance on the part of the contractor and one upon which a great deal of credit to the repair facilities of the Port of New York can be given.

This one repair involved an expenditure of over $400,000, and the United States lines took every precaution to make the ship thoroughly seaworthy and in better condition than she was before the fracture.

S. S. City of Barcelona a Modern Freighter

The CITY OF BARCELONA is of particular interest to all shipping men because of the rather unusual improvements in her main drive and in her cargo handling arrangement.

She is a single screw steamer built by Barclay, Curle & Co. Ltd. for the Ellerman Lines Lt. Successful trials were carried out in the Firth of Clyde on April 30. The new vessel is built to the highest class of Lloyd's Register and the principal dimensions are as follows: Length, 425 feet; breadth, 58 feet; depth, 29 feet 9 inches; gross tonnage, 5600 and deadweight tonnage, 9500. There are large open hatches and long erections, the hatches being well served by an ample number of steam winches and derricks. Special arrangements have been made in No. 2 hold and in the forward well deck for carriage of locomotives and tenders. Loading and stowage have been worked out so that it is possible for the locomotives and tenders to be delivered in a completed condition alongside the ship, lifted on board by means of special derrick gear with which the ship is equipped, and at port of discharge lifted on to the railway track, ready to be driven off under their own steam.

In her propelling machinery this vessel is also unusual, use having been made of modern developments in augmenting the power of a reciprocating engine by making use of the low pressure exhaust in a turbine. The main engine is of the steam reciprocating four crank, triple expansion type with cylinders 23½ x 40½ x 50 x 50 inches by 48 inches stroke. It is fitted with Beardmore-Caprotti valve gear and is designed for a working pressure of 265 pounds per square inch and 150 degrees superheat.

An electric motor is fitted to the main line shafting and receives its power from an auxiliary electric generating set driven by the exhaust steam from the main engine. This part of the machinery was designed and constructed by the Metropolitan Vickers Electrical Co. Ltd. The vessel is fitted with two main boilers of 15 feet 7½ inches internal diameter by 12 feet 6 inches in length, and one auxiliary boiler, 12 feet 6 inches in diameter by 12 feet in length. This is a progressive engineering installation and will be watched with interest.

Mail Contracts Awarded

On May 19, Postmaster General Brown signed a contract with the Tampa Interocean Steamship Co., New Orleans, for carrying the United States mails by water from New Orleans to ports in Spain and Portugal.

The contractor is required to operate cargo vessels of class 6, capable of maintaining a speed of 10 knots and of a gross tonnage of not less than 5000 tons. At the expiration of three years of the contract term the steamship company must substitute two new cargo vessels with limited passenger accommodations of class 5, of a gross tonnage of not less than 5000, with a speed of 13 knots, which may be raised to 14 knots, in the discretion of the Postmaster General. The mail contract runs for ten years and calls for 32 trips a year.

Shipbuilding Suit Is Formally Closed

Following a compromise payment of $3,500,000 to the government, the United States circuit court of appeals has formally dismissed the suit against the Skinner & Eddy Shipbuilding Corp., Seattle, in which the government originally asked for judgment in the sum of $11,000,000. This settlement ends litigation which has been in the courts for nearly 10 years. It resulted from cancellation of contracts for building steel ships at the Seattle yard following the armistice and also involved matters connected with the lease-option purchase agreement with the shipping board of the yard formerly owned by the Seattle Construction & Drydock Co. Under the recent agreement the Seattle builders withdrew their petition for a writ of review before the United States supreme court of the decision of the United States circuit court of appeals which found that the government was entitled to a judgment of $6,427,360.19 This decision was rendered last November upon an appeal from the decision of Federal Judge Neterer at Seattle who awarded the government $1,380,000 from which findings both litigants appealed. Under the original suit the government claimed $11,491,000 while the builders asked judgment for $17,493,000. The circuit court decision decided that the firm owed the government $9,252,805.38 but had proper credits of $1,692,702.09 and also had the right to set off as "just compensation" a further sum of $2,615,992.08.

Pulverized Coal Burner

The board on May 21 authorized the Merchant Fleet Corp. to proceed with a plan to equip the S. S. LORAIN with Todd pulverized coal burning equipment. The cost of this work will be approximately $61,600.

Pulverized Coal Burning System Efficient

Efficiency of pulverized coal as a dependable marine fuel was demonstrated on the recent passage of the Oriole lines freighter WEST ALSEK from Ireland to Boston when the vessel encountered the most severe weather of recent years in the North Atlantic. The pulverizing apparatus operated smoothly, even while the vessel was rolling 45 degrees and the results were highly satisfactory in spite of the fact that wet coal of about 12,000 B.t.u., taken on at a British port, was being used. The coal was so wet that a man had to stand by to keep it in motion to the pulverizers.

The WEST ALSEK is equipped with the Todd unit system of pulverized fuel burning and has been in regular service as a pulverized coal burner for the past ten months, during which time the apparatus has performed satisfactorily on both American and British bituminous coal of the cheaper grades. During this period the equipment has been under the observation of both Europe and American marine engineers and the consensus of opinion has been that the new form of marine fuel has demonstrated economies and dependability much beyond the claims put forth by the pioneers of the system.

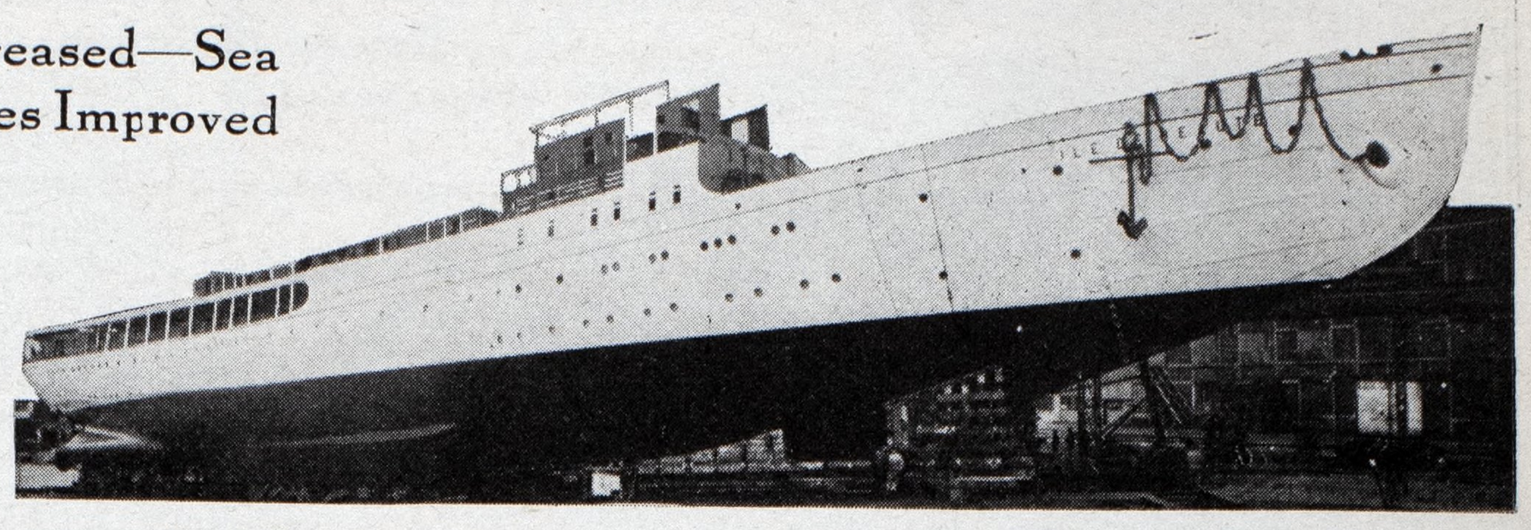
The installation on the WEST ALSEK has shown a 20 per cent increase in horse power and a 10 per cent increase in speed with an increase of only 3 per cent in coal consumption. As a hand fired job, the WEST ALSEK burned 464 pounds of coal per mile with a speed of 8.78 knots and 1790 indicated horsepower. As a pulverized coal burner the ship burned 449 pounds of coal per mile with a speed of 9.58 knots and 2250 indicated horsepower. With the pulverizing apparatus it also has been possible to use a much cheaper grade of coal. A saving of 20 per cent also has been made in the fireroom crew.

To Celebrate Weighing

Beginning the Second Century is the title of a handsome booklet issued by Fairbanks, Morse & Co., Chicago, to commemorate the completion of a hundred years of accomplishment by the company which was organized in 1830 by Thaddeus Fairbanks. An interesting history is given of the development of weighing machines with separate chapters on the age of power and the new era of speed and accuracy. Excellent illustrations are used throughout and the booklet is a fitting memento of the occasion which it marks.

Special Hull Form Applied
To Small Fast Passenger Vessel

Speed Is Increased—Sea Going Qualities Improved



Ile de Beaute—Maier Form Hull—On the Stocks at Weser Yard, Bremen

THE Weser yard in Bremen, subsidiary of the Deschimag shipbuilding merger, has recently completed and delivered one of the most modern small, fast steamers afloat, built according to the Maier form. This is a patented shape of hull with less resistance and added seagoing properties.

There are already 17 ships in service, built on these lines, of which the first have shown excellent results during two years. The savings resulting from this form as indicated in model tank experiments, have been fully confirmed in actual practice. Moreover, these Maier ships show extraordinary seaworthiness in the heaviest storms. The better seaworthiness might be more clearly described principally as less and smoother pitching movements than similar ships of normal lines. The result of this easier pitching is not only a dry deck, only spray coming over—no solid water whatever, but also the elimination of racing of the propellers, which are features which cause the Maier ship to lose less speed in heavy weather and consequently show a considrably higher average speed as compared with normal ships. The latest Maier ship, the ILE DE BEAUTE, illustrated herewith, built for German reparation account, has been constructed according to the most modern ideas, not only from a technical shipbuilding standpoint but also in respect to her interior decorations. She is to ply between Nice, France, and Corsica and she will appeal to the most exacting tastes not only through her high speed but also by means of her interesting appearance and her very comfortable passenger arrangements. There are passenger accommodations for 40 first-class passengers, of which 8 are cabins de luxe. In addition there are accommodations for 32 second class passengers in cabins which are equipped with Pullman berths with the exception of a few with two beds. There are, of course, the usual dining rooms, smoking rooms, and a music room built across the entire width of the ship.

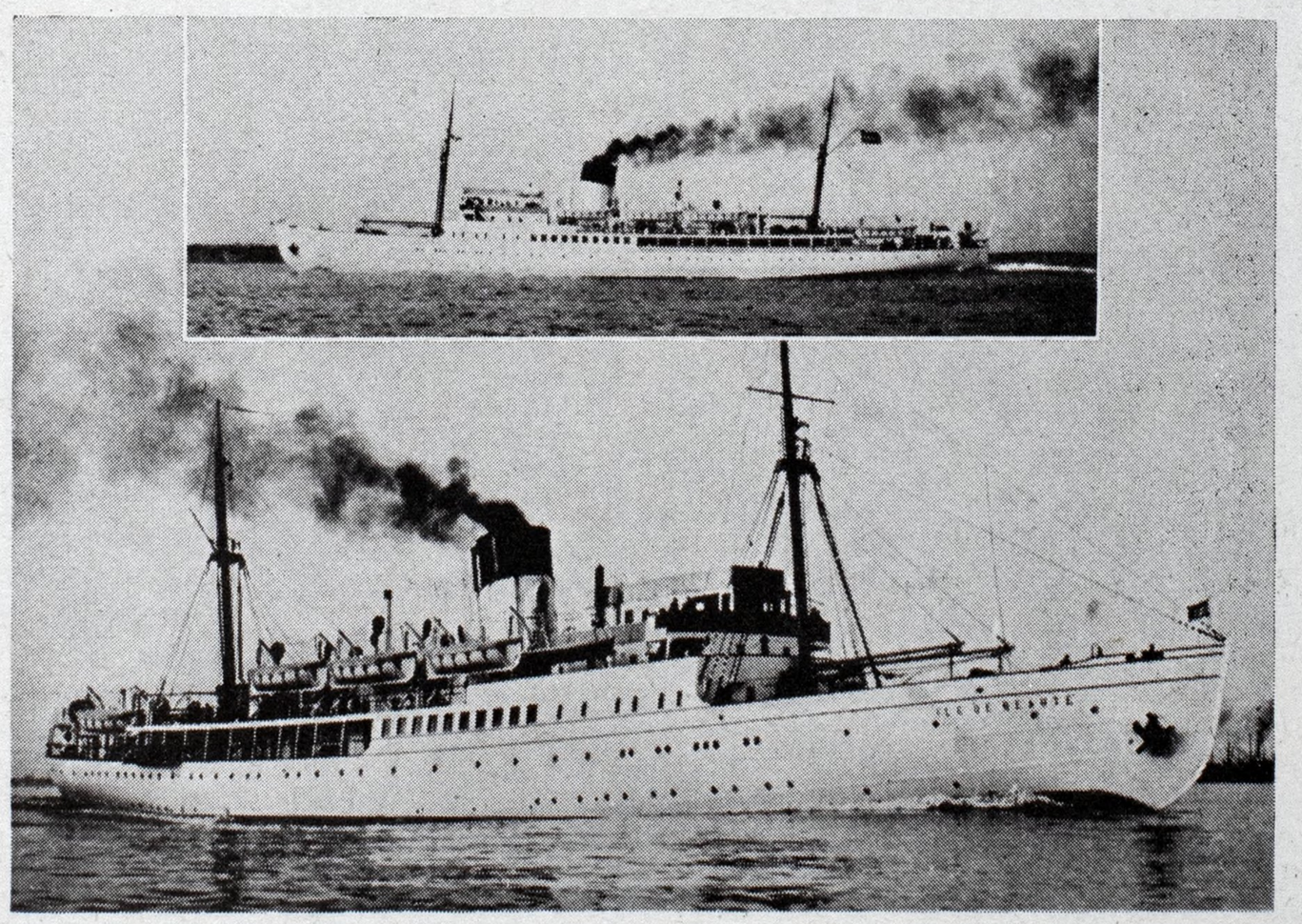
Maier Form Ship Lines

SINCE the beginning of naval architecture, attempts have been made to develop a practical seaworthy form of vessel for minimum resistance. The greatest experimenters have devoted years to this research. The so-called Maier form, used in Ile de Beaute, while intended to give minimum resistance, also adds to rather than detracts from the seaworthy qualities of the vessel. The general features of this form are based on sections of modified triangular shape. The forefoot is cut away giving somewhat the shape of a yacht or icebreaker. Wave formation at high speed shows less energy dissipated in this manner.

The principal dimensions of the ship are as follows: Length between perpendiculars, 305 feet; breadth, 45 feet; displacement, 2800 tons; and depth, 16.4 feet.

The engines consist of two turbines of 2960 horsepower each. Steam is generated in four oil burning Capus boilers. At 5320 horsepower the vessel made 19.6 knots. While developing 5920 horsepower the vessel made a speed of 20.3 knots. The guaranteed trial speed was 18.75 knots at 5920 horsepower on her voyage to Marseilles, where she was to be delivered. The weather was very rough with constant headseas, but she never lost more than two knots at wind-force of 10, and no solid water came on deck. Movements were very smooth and easy; no pitching.

From the accompanying illustrations it will be seen that the Maier form lends itself to give the vessel a yacht like appearance. Over 20 vessels have been or are now being built with this form of hull, from a small fishing trawler up to a 16,000-ton freighter. Without a single exception they all have been successful. While at first the speed increase or the saving in power due to less hull friction were considered to be the main advantages, shipowners who have had Maier ships in operation claim the most important feature is seaworthiness.



Fast Passenger Vessel Ile de Beaute—Maier Form of Hull—Speed Over 20 Knots—Inset Showing Wave Formation at Full Speed

Late Decisions in Maritime Law

Legal Tips for Shipowners and Officers

Specially Compiled for Marine Review
By Harry Bowne Skillman
Attorney at Law

GENERAL average is entirely independent of the contract of carriage, and arises as pure equity out of a sacrifice made or an expenditure incurred for the common benefit, it was said in the case of LEWIS H. GOWARD, 34 F. (2d) 791. Exceptions in a charter party or bill of lading do not apply to it, unless they are expressly stated to do so. A shipowner, whose negligence has contributed to a distress which caused the sacrifice or expenditure for the common benefit, can recover no contribution in general average from the cargo, unless the right to recover is expressly reserved in the charter party or bill of lading. An exception in a charter party, relating to "act of God, . . . fire, floods, storms, . . . or any occurrence beyond the control of either party," etc., applied only to the contract of carriage, and did not affect recovery of contribution from cargo in general average; such exception, if applicable to general average, is not available where the peril which caused the expenditure was due to unseaworthiness discoverable by due diligence before the voyage began.

* * *

THE general principles on which salvage awards are based have been long settled. The principal elements to be considered are the values of the property saved, and of the property used in saving it, and the perils from which the salvaged property was rescued. With regard to derelicts it has been said that the salvage award should be liberal. The primary consideration is the amount of benefit conferred by the salvage service, as salvage is a reward to service, not a quantum meruit for labor expended. In the case of GERBEVILLER, 34 F. (2d) 825, it was held that no award should be made for saving life of a schooner's crew, it appearing that the schooner was towed to port after being abandoned and left a derelict, and it being therefore not certain that the crew would have been lost, if they had stayed on board.

* * *

WHEN a barge leaks so that she careens and dumps her cargo, the inference is, in the absence of other cause, that she was unseaworthy; inability to withstand the ordinary strains of loading or discharge is unseaworthiness. — CARY BRICK CO. No. 8, 34 F. (2d) 981.

* * *

A CLAUSE in a ticket for transportation of a passenger by water requiring notice of claim for injuries in writing within 30 days after the passenger lands from the steamer at the termination of the voyage, is valid; 30 days is not too unreasonably short a period. In a libel against the steamer for injury to a passenger falling through the hatch, the burden was on the libelant to prove compliance with the provision requiring such notice, and the fact that the passenger was a minor did not relieve her from compliance with the provision.—FINLAND, 35 F. (2d) 47.

* * *

STEEL vessels which carry sugar cargoes are subject to rapid deterioration, and this danger being well known, requires the owner to take extra precautions to keep the vessel seaworthy.—ELKTON, 35 F. (2d) 49.

* * *

OWNERS of a sunken boat are not required to raise her but may abandon her and thereby put an end to their liability beyond her value; the ship-owners' rights in that regard being established in a proper proceeding under the appropriate statutes limiting their liability.—City of Newark v. Mills, 35 F. (2d) 110.

* * *

CLAUSE of bill of lading requiring notice of claim of damage before goods are taken receipt of was held valid in the case of Duche v. Thomas & John Brocklebank Ltd., 35 F. (2d) 184; notations of "wet stain" made on delivery book were not a sufficient compliance with said clause. In the case cited it was also held that ventilation apertures have to do with care and custody of cargo and not with management of the ship, which is excused under the third section of the Harter act, but if it be shown that the damage to the cargo resulted from a peril of the sea, there can be no recovery. The peril which forms a good exception in a bill of lading means something so catastrophic as to triumph over those safeguards by which skillful and vigilant seamen usually bring ship and cargo to port in safety.

* * *

UNDER the "old rules" in admiralty, a seaman accidentally injured is entitled to no more than ordinary maintenance and care, unless his injuries resulted from what might be construed as the unseaworthiness of the vessel.—BALL BROTHERS, 35 F. (2d) 261.

* * *

THE suggestion, made in the case of Bronx Barge Corp. v. Connelly Transportation Corp., 35 F. (2d) 294, that vessels drawing 10½ feet should navigate a narrow slough of only 9 feet depth, said the court, was too fantastic to be noticed, and that in such situation, the master had no choice of routes, and his duty was performed when he exercised his judgment as a mariner in determining the question when to put to sea. He was charged with the obligation of bringing to the performance of his duty reasonable care and skill, it was declared, and his vessel was liable for his failure in either respect.

* * *

SELF-SERVING statements, made in log books, are not competent evidence.—FAVORITA, 35 F. (2d) 352.

* * *

THE provision in a charter party for "lay days for loading if required by the party of the second part, not to commence before 96 hours after steamer is ready," means that the charterer had 96 hours free time only if required, and where the ship was docked and loading commenced within one hour and ten minutes after reporting readiness, only that period of free time would be allowed. Where another provision of the charter party allowed dispatch money "at the rate of 16 cents per gross registered ton, and both demurrage and dispatch not reversible," and lay days were dealt with in another clause excepting Sundays and holidays from computation as lay days, the charterer was not entitled to payment of dispatch moneys for Sundays and holidays—United States v. Gano-Moore Co., 35 F. (2d) 395.

* * *

IF INJURY to a seaman occurred from negligence without the privity or knowledge of the owner of the vessel, he was entitled to limit his liability for the injury to the value of the vessel, although there was only one claimant.—ALOHA, 35 F. (2d) 447.

* * *

THE owner of a tugboat, the captain of which negligently set certain barges adrift while attempting to take out another barge during a storm, could not recover, as owner of another tug, for salvage claims against the barges.—BRINTON, 35 F. (2d) 543.

* * *

IF A ship is not seaworthy within the meaning of the rule on that subject, so that the cargo is liable to be damaged by a storm of ordinary intensity, the fact that the particular storm which did damage to the cargo was of extraordinary violence would not exempt the owner from liability. The owner of a ship is under continuing liability to furnish for each voyage a vessel reasonably fit to carry cargo placed aboard her.—Atlantic Transport Co. of West Virginia, v. Rosenberg Bros. & Co., 34 F. (2d) 843.

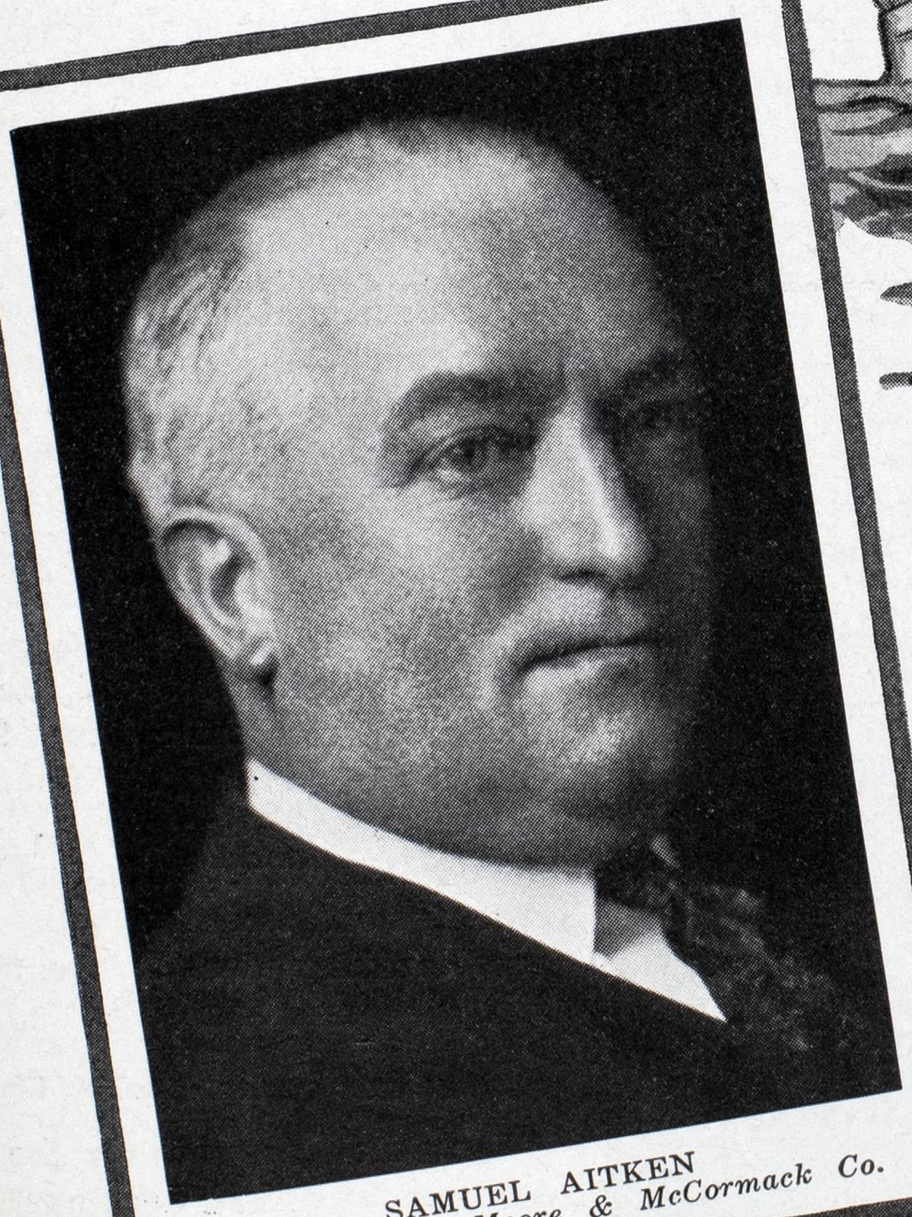
MEN of MARINE AFFAIRS



A. H. FERBERT
Vice President, Pittsburgh S.S. Co.



J. C. ALDERMAN
Asst. Mgr. Great Lakes Dredge & Dock Co.



SAMUEL AITKEN
Vice President, Moore & McCormack Co.



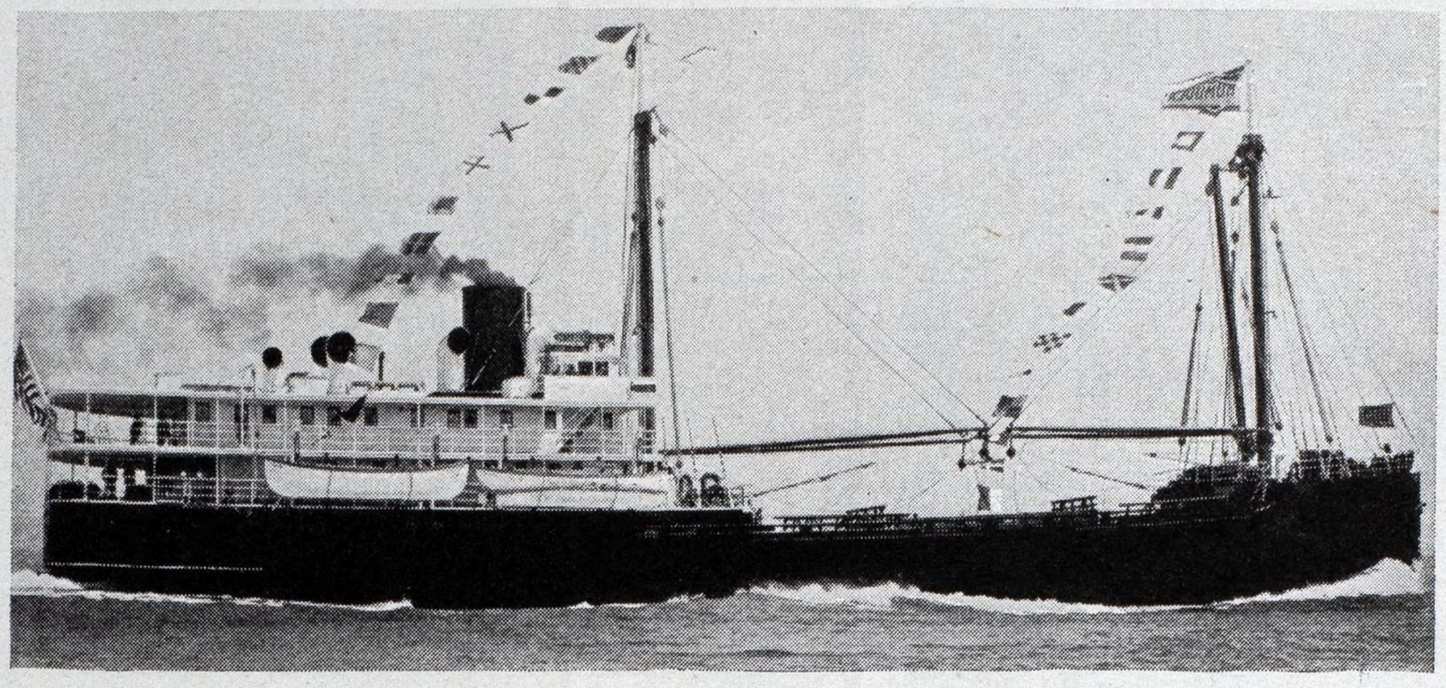
LESTER P. JONES
United Fruit Co.

Photos by Blank-Stoller, Inc.

Geared Turbines for Lake Ships

Saving in Fuel, Weight, Space—Original Cost Not Greater —Mechanical Firing of Coal—Modern Steam Conditions

By Carl J. Lamb



SINGLE SCREW STEAM GEARED TURBINE VESSEL HUMUULA

COMPETITION is the breath of life to industry and is probably responsible for our greatest advances as an industrial and manufacturing nation. Witness, over the span of a few short years, the progress made in motor, rail, air and ocean transportation. The intent of this article is to discuss the geared turbine for ship propulsion particularly as applied to Great Lakes vessels, since these craft are among those remaining afloat which have not kept abreast of the ocean-going engineering progress, as far as improving engine room economy, reducing weight and space requirement, and increasing reliability are concerned.

The average lake steamship operator or builder, when approached on the subject of geared turbines, almost invariably says first, that a ship has a greater first cost if propelled by geared turbines, second, that he is satisfied with the reciprocating engine which the operating engineers are familiar with, and third, why should he be the first man on the lakes to install one. This attitude, on the surface, seems to be quite conservative and safe. It is not, however, progressive, modern, or justified. What would be the state of development of the airplane, radio, automobile, newspaper, boiler, diesel engine, turbine-generator, electric light, refrigerator and the countless other wonders of our modern life had such an attitude persisted?

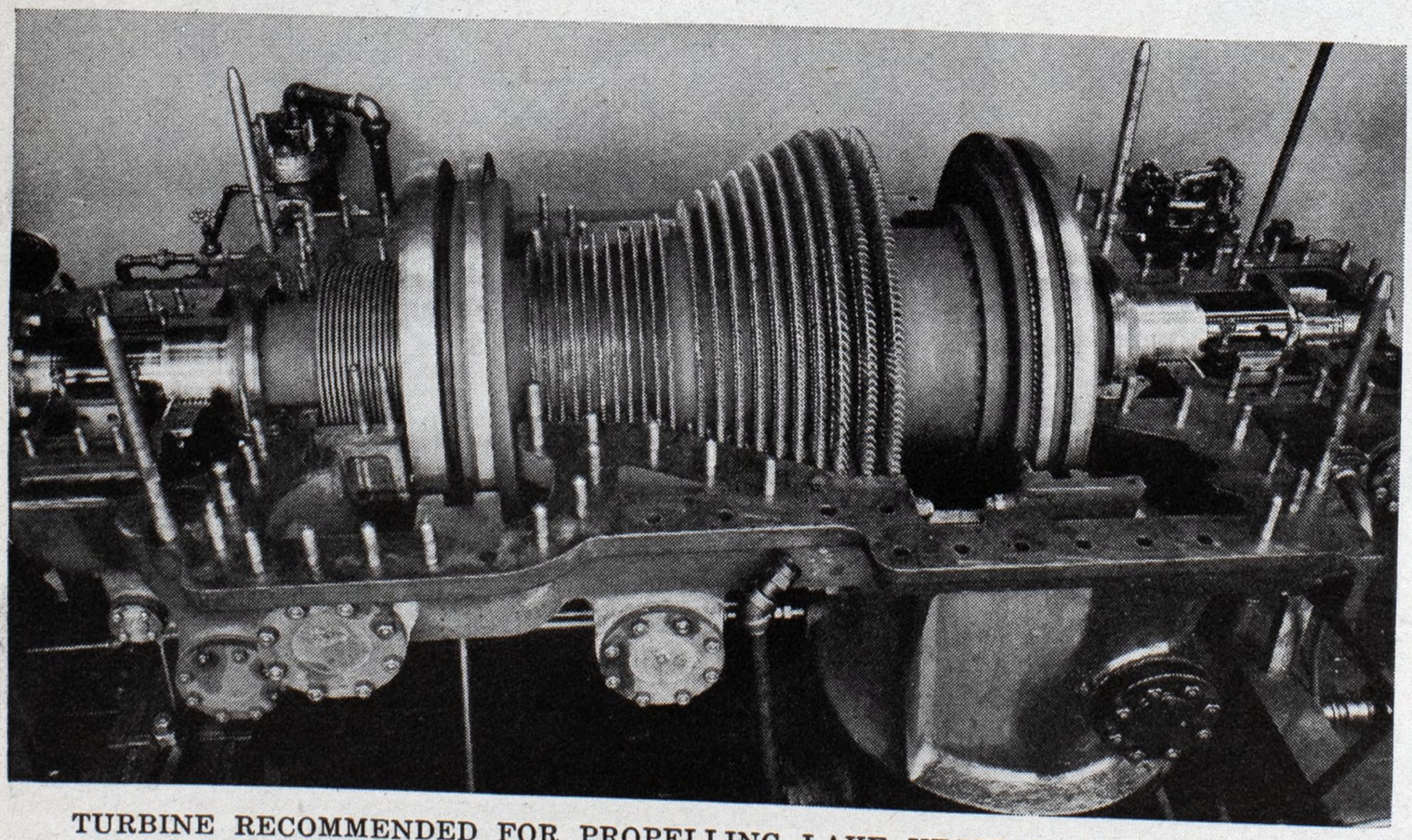
Carl J. Lamb, the author of this article, is head of the Marine Sales Section of the Westinghouse Electric & Mfg. Co. at its South Philadelphia, Pa., works.

Responsibility of the Shipbuilder

When all is said and done, it is probably natural that the shipbuilders themselves have been partly responsible for preventing the advent of the modern geared-turbine for propelling bulk freighters, passenger vessels and fire boats on the Great Lakes. This is understandable since these shipyards are also engine builders and are loath to surrender the profitable manufacture of stock machinery for which they have all designs, patterns and parts developed. Such an attitude, however, is not indicative of the broad vision necessary to promote progress in any field of industry and is to be deplored, since, after all, the shipbuilder has a definite responsibility to the shipowners to help develop and advance the art of shipbuilding and engineering for the best interests of all parties concerned.

It may be thought, perhaps, that the writer has a selfish interest in presenting and urging the case of the geared-turbine for consideration. It should be borne in mind, however, that new developments and advances are made, generally, because of a great demand by the user, upon the manufacturer, to produce more efficient, more reliable machinery, and the manufacturer reacts to these demands primarily because of competition.

The geared-turbine for ship propulsion is now (and has been for years) a finished perfected engine. This is so because of the demands of the navy and deep sea merchant ship operators and because of competition between the recognized manufacturers of geared-turbines in this country where the development of the geared-turbine has reached a higher stage of perfection than it has abroad. Contrary to the attitude of the deep sea operators, and their demand for more efficient propelling machinery, the operators on the lakes seem content to go on indefinitely using obsolete machinery and seem unwilling to give consideration even to the modern developed geared-turbine.



TURBINE RECOMMENDED FOR PROPELLING LAKE VESSELS—CASING LIFTED

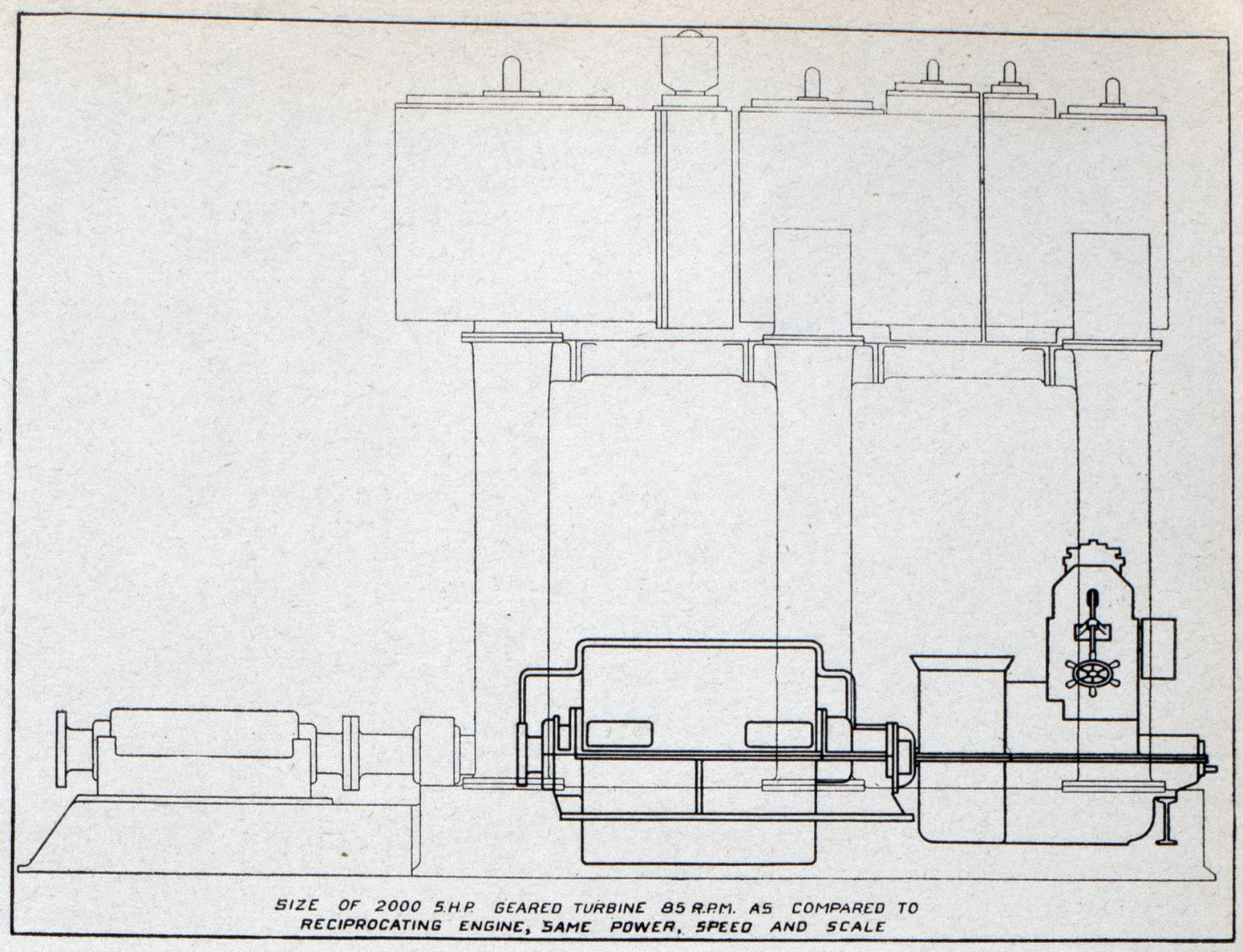
Arousing the Lake Operator

Inasmuch as such is the case and since we have had designs of machines developed, perfected and tried out in many vessels for a long period of years, we are trying hard to develop an active interest in the use of geared turbines to propel Great Lakes bulk carriers with the conviction that their use will be well justified because of

decreased operating and maintenance costs and of greater cargo-carrying capacity on the same draft with the resultant benefit of greater profits.

After several years study of the particular problems and proper application requirements associated with the propulsion of bulk freighters, and having in mind that reliability and continuity of operation are of first importance, we have worked up and give herewith a comparison between a geared-turbine unit, including condenser, which we believe to be the more reliable, and the large, heavy, cumbersome, reciprocating engine now being used in such ships.

In order to have a fair comparison between the two types of drive, and to be absolutely certain that the two are placed on the same basis, we are taking two exactly similar vessels as follows:



Comparison of Standard Bulk Freighters. 90 RPM of Propeller:

1—2000 S.H.P. Geared Turbine	1—2200 I.H.P. Reciprocating
2—Water-tube boilers	2—Scotch boilers
2—Multiple retort underfeed stokers	1—Surface condenser with aux.
1—Surface condenser with aux.	1—Horseshoe thrust
1—Kingsbury propeller thrust	Water in boilers
Water in boilers	Water in condenser
Water in condenser	Lubricating oil
Lubricating oil	Coal consumption per hour
Coal consumption per hour	Underway 3875 pounds in port 817
Underway 2598 pounds in port 817	

Total coal for round trip from Conneaut, O., to Duluth, Minn., with no cargo upbound, taking seven full days, or 150 hours under way at 2000 shaft horsepower of turbine, 2200 indicated horsepower of engine and 18 hours in port for either case:

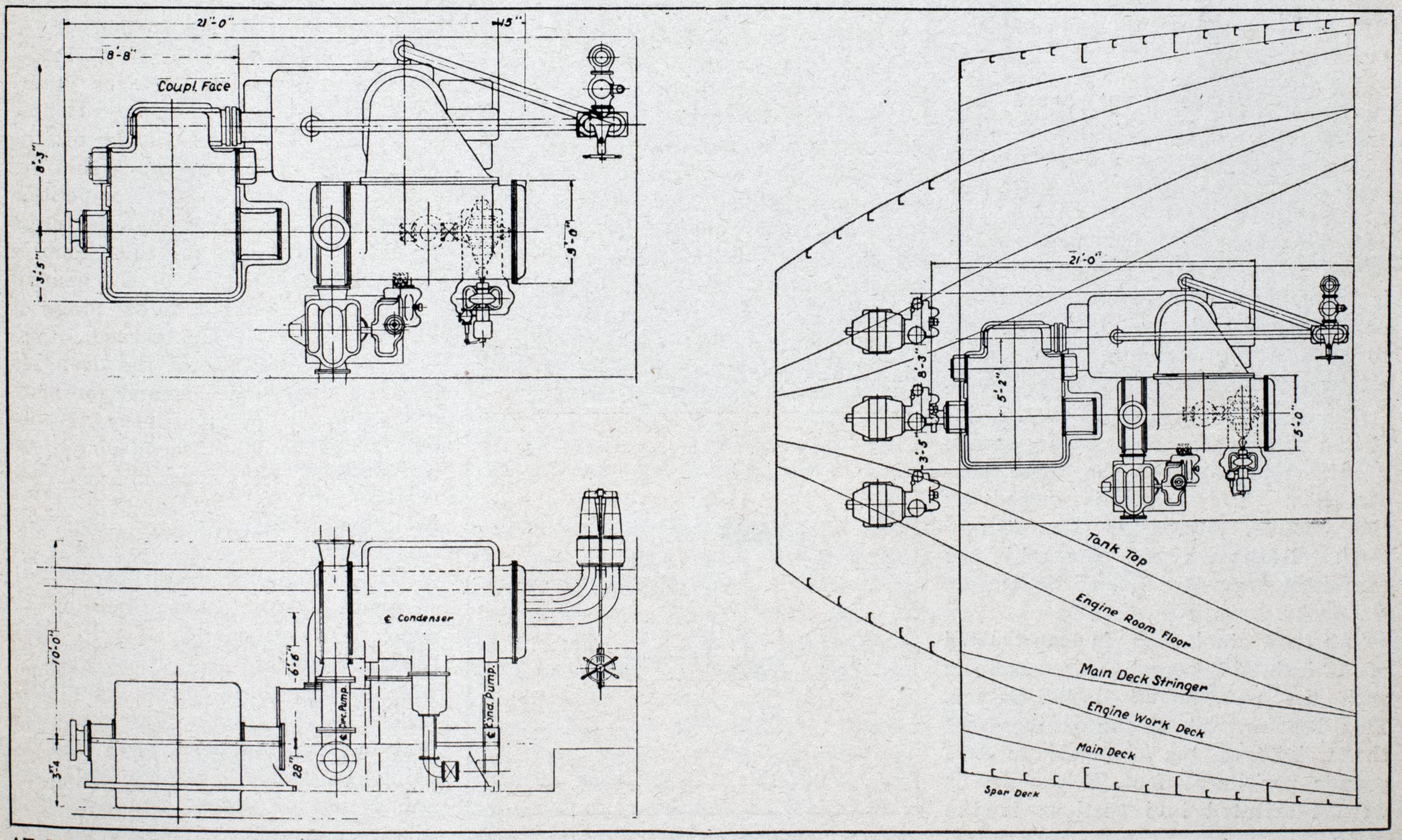
Total weight of the above main boilers, propelling machinery, stokers, coal, lubricating oil, water in boilers, water in condensers, each case:

195 tons	298 tons
807,000 pounds	1,367,400 pounds

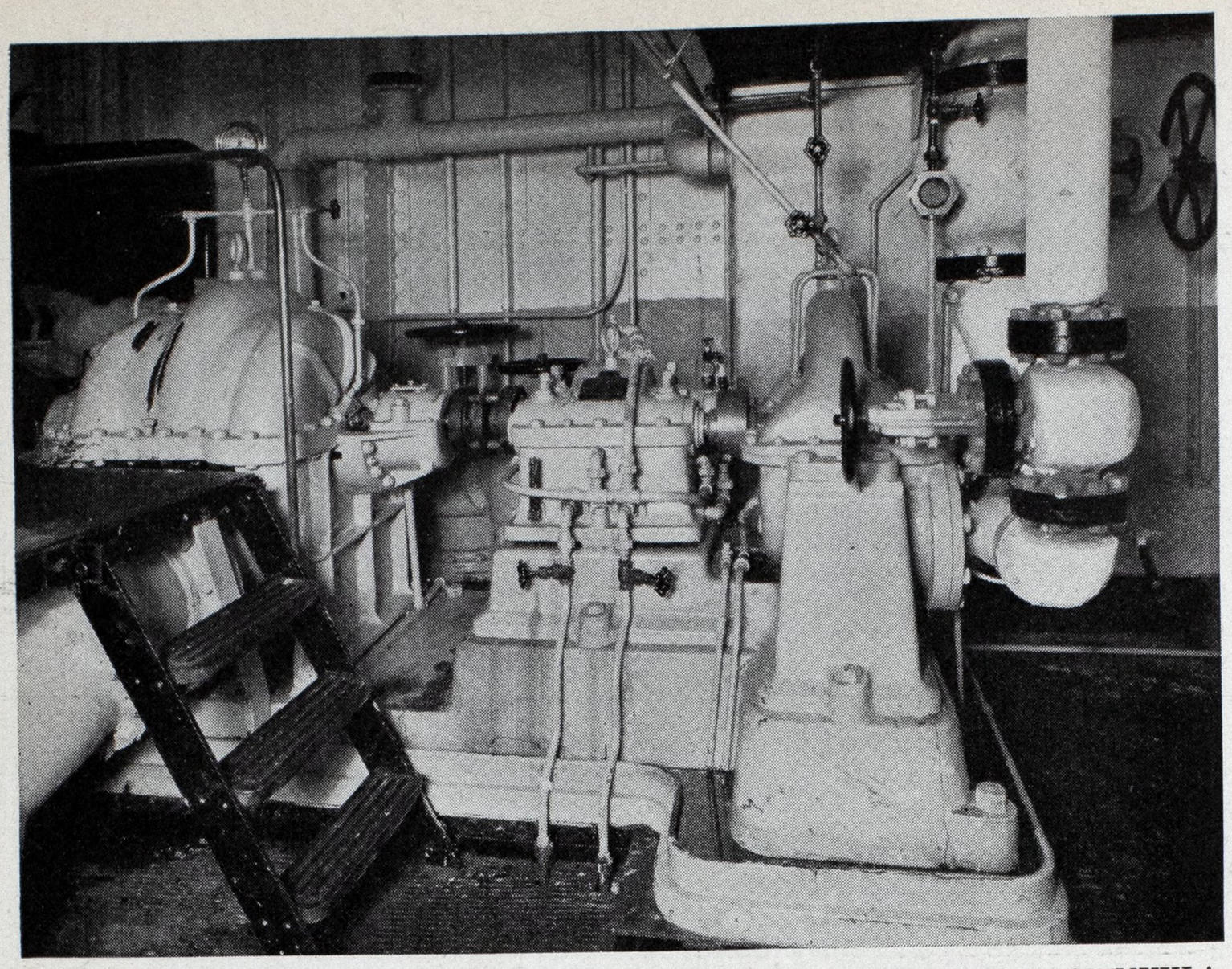
All other engine room and deck auxiliaries same for each case. Net saving of machinery, water and fuel in vessel having water-tube boilers, stokers and geared-turbines is 560,400 pounds or 280.2 tons.

This weight saving represents useful revenue-earning cargo which could be carried on each down-bound trip. It should be noted in addition, that no credit has been given to the geared turbine ship for having foundations of considerably less weight, which it would have, as a result of its much smaller machinery weight.

Now, based upon an average season of seven months, and an average ship speed which would result in 30 round trips per season, we can make an analysis of the savings of the ship propelled by the geared-turbine, when compared with the one having reci-



AT LEFT—PLAN AND ELEVATION OF STEAM TURBINE GEARED UNIT DESIGNED TO PROPEL GREAT LAKES FREIGHTERS. AT RIGHT—PLAN OF STANDARD ENGINE ROOM OF LAKE BULK FREIGHTER WITH GEARED TURBINE MACHINERY IN PLACE



MAIN CIRCULATING PUMP ON THE STEAM TURBINE GEARED VESSEL HUMUULA

procating engine, each having all other deck and engine room auxiliaries exactly the same as follows:

Cost saving, resulting in Turbine Driven Vessel	
Coal, at $5.25 for scotch boiler, $4.25 for stoker fired water-tube boiler, 30 trips 298 tons, required for reciprocating engine vessel, 195 for geared turbine ship	$22,072.50
Additional cargo capacity 280x$70x30	5,880.00
Saving in crew wages, three firemen x (105 plus 35) x 7.5 months	3,150.00
Lubrication	903.00
Total savings in season, in favor of geared-turbine ship	$32,005.50

Total increased investment for geared-turbine vessel as represented by stokers, fan and two coal conveyors.....$24,000.00

What is Total Cost

Whenever the question of the cost of a bulk freighter, propelled by geared-turbines and having water-tube boilers, has come up in the past, the prospective ship buyer has been informed promptly by the shipyard that such a ship will cost more than one having reciprocating engines and scotch boilers, same being built by the shipyard. We cannot enter into a dispute with any ship builder regarding the point of his own costs, which he has available and which we do not know. We have been able, recently, however, to obtain actual quoted figures on scotch boilers from shipyards and on reciprocating engines from engine builders and we can truthfully say that the complete ship, with steam up, ready to be turned over to the purchaser, should cost less, if equipped with water-tube boilers and geared-turbines, as far as machinery is concerned, than if propelled by reciprocating engines with scotch boilers. There will be an extra first cost for stokers, coal conveyers and blowers, a decrease of machinery weight, and a decrease of coal and crew costs.

It would be possible, of course, to eliminate the items of extra first cost by using hand fired water tube boilers to generate steam for the geared turbines, but at some loss of boiler efficiency, which would increase the fuel and crew costs, as pointed out.

The geared turbine and condenser equipment which the Westinghouse Electric & Mfg. Co. has worked up and proposed for service on Great Lakes vessels are in no way new, revolutionary or experimental, but are the result of 32 years' experience in building turbines for land use, and of 19 years' experience in building ma-

(*Continued on Page* 62)

Ship's Tank Top--Arc Welded Channels

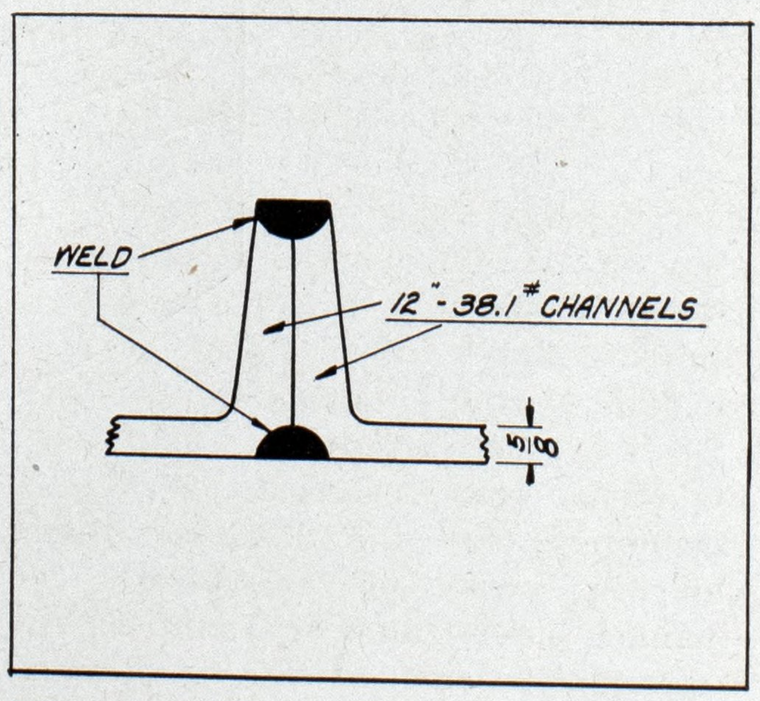
By C. M. Taylor

WHEN the Great Lakes bulk ore carrier CHARLES O. JENKINS left her winter quarters this spring to begin operation she was equipped with a new tank top. This new tank top which was completed just before shipping began, is constructed of ship channels fabricated by arc welding. It is expected to have a life of more than double a tank top of the old type construction.

The work on the JENKINS also included bulkheads and lower strake of the side tank of the same construction. The vessel is owned by the Jenkins Steamship Co., Cleveland. The work was done by the Cleveland Stevedore Co. at its Huron, O., docks.

The new tank top is constructed of 12-inch, 37 pound, ship channels with the web increased to ⅝-inch. This heavier web thickness increases the weight of the channels to 38.1 pounds per lineal foot. The channels were fabricated into sections in the hold of the vessel by the arc welding process. They were then placed into position and the sections joined to each other by the electric arc. The sections were made up of 10 channels each 48 feet long. This modern method of construction eliminated all shop fabrication, and reduced the handling of the steel to a minimum. There was no laying out or punching of the flanges of the channels as is necessary in riveted construction. It was merely necessary to unload the channels from the car to the deck of the steamer, then into the hold as they were needed.

The work on this steamer was the first of this modern method of tank top construction to be fabricated by electric arc welding. It was also the first time that arc welded construction has been used in place of riveted construction in modern tank tops on a Great Lakes' vessel. The new channel steel construction of tank tops fabricated by riveting was first used in the retanking last year of the steamers COLONEL and GRAND ISLAND which are owned by the Cleveland Cliffs Steamship Co., Cleveland. It was through these initial installations which proved to be quite successful, that a step further was taken in going to welded construction. The application of welded construction to this new system of fabricating tank tops has permitted a stronger, and



DESIGN OF WELDED CHANNEL CONSTRUCTION FOR SHIP'S TANK TOPS

The author, C. M. Taylor, is vice president of the Lincoln Electric Co., Cleveland, O.

all around better job than formerly.

The weight of the channel tank top is slightly greater than a plate top, but has approximately double the strength of the plate construction. In renewing tank tops on lake steamers, however, this item is negligible because the retanking is always heavier than the original construction.

In fabricating the sections in the hold of the vessel, ten ship channels were laid side by side, as shown in the upper left hand corner of the large illustration. They were squared and clamped together. When the sections were perfectly squared and clamped they were tack welded together on the toe so as to hold them in place while being joined to each other by the electronic tornado process of automatic carbon arc welding. By this process the metal in the heels and the toes of the flanges of adjacent channels were fused into each other without the use of additional metal. Thus the entire tank top is literally one solid piece of rolled steel with the joints as strong as the members they join. In joining the channels, speeds of 65 to 70 feet per hour were attained on toes of the sections. As the sections were finished, they were turned over and laid in place parallel to the keel. The flanges of the channels were then welded to the floor by means of plate chips on alternate flanges.

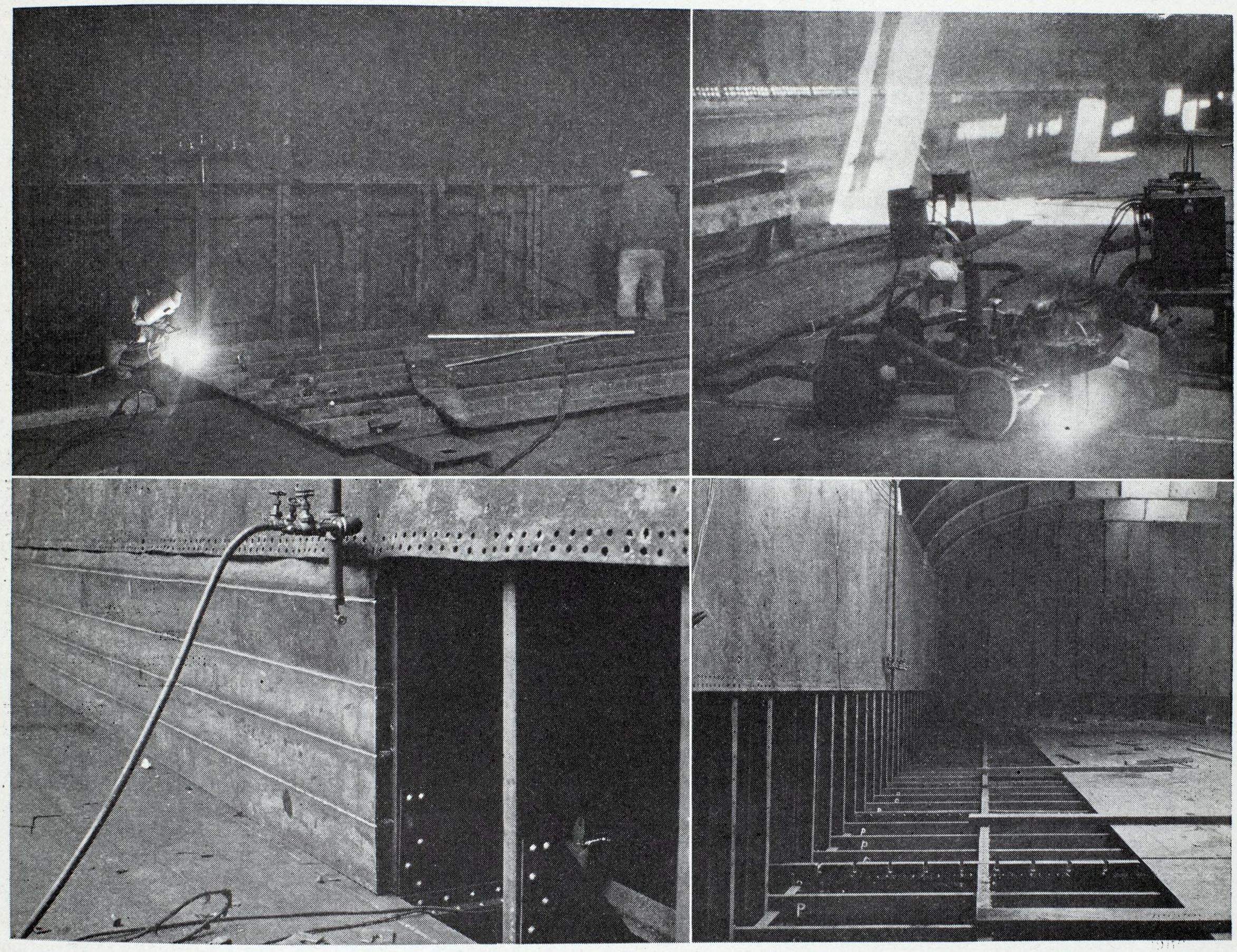
When the channel sections were tack welded in place, parallel to the keel, the automatic welder was again placed into position on the sections and the heels welded together. The accompanying illustration shows the electronic tornado automatic tractor welding a seam. This machine utilizes the carbon arc welding process and fuses the metals into each other as it travels along the seam. There were approximately 48,600 lineal feet of welding on the CHARLES O. JENKINS.

This modern type of ship construction was designed by W. G. Bartenfeld, for the Jenkins Steamship Co., owner of the vessel. The Channel Steel Hull Corp. controls the American patents of W. G. Bartenfeld for the channel system of construction.

The advantages of the channel system of construction, fabricated by arc welding, over the traditional riveted plate construction is a stronger and more rigid tank top with practically no increase in weight, and a reduction in construction costs. The additional stiffness is obtained due to the flanges of the channels acting as continuous stiffeners, and because they are more closely spaced than the stiffeners in tank tops of the traditional plate construction.

For intermediate floors, the channel tank top only requires half the number of stiffeners as in the plate tank top because the flanges of the channel tank top have enough strength to permit a wider floor spacing than can be obtained in a plate tank top.

Maintenance costs are reduced and life of the tank top is increased due to elimination of rivets which often work loose and whose heads become badly worn due to abrasive action of buckets and cargo; also because this type of tank top has practically double the strength against buckling as that of the plate tank top.



UPPER LEFT—TACK WELDING SECTION OF CHANNELS BEFORE FINAL WELDING WITH AUTOMATIC CARBON ARC—UPPER RIGHT—MAKING TANK TOP IN ONE PIECE OF STEEL BY ELECTRIC WELDING CHANNELS. LOWER LEFT—SECTION OF WELDED CHANNEL SIDE TANK IN PLACE. LOWER RIGHT—SECTION OF WELDED CHANNEL TANK TOP—ALL VIEWS OF STEAMER C. O. JENKINS

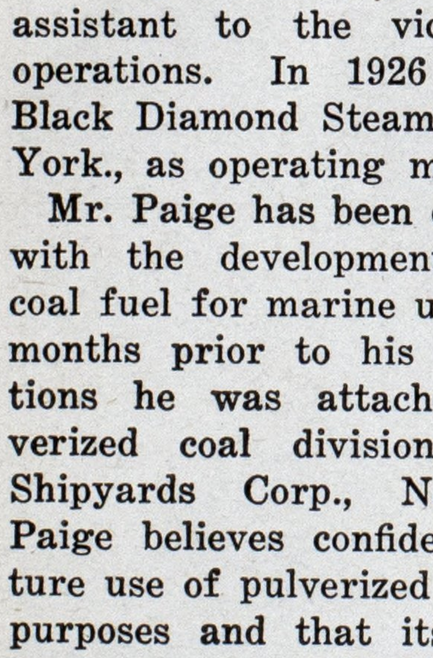
Consulting Engineers Open New York Office

Announcement was made recently by J. F. Paige and Christopher Strachan of the formation of the John Strachan Co., 17 Battery place, New York, to carry on the marine consulting, surveying and appraisal business of the late John Strachan.

Mr. Paige has had a varied and interesting technical and practical background of experience in the designing, building, repairing and operating of ships. After six years as apprentice and journeyman on mechanical and marine engineering work, he spent five years at sea, serving through all grades to and including chief engineer. From 1903 to 1916 he was connected with the Fore River shipyard and was sent by that yard as its official representative to Japan for two years and to Italy for one and one-half years in connection with important naval contracts.

In 1917 he joined the Port Arthur Shipbuilding Co., Port Arthur, Ont. as general manager, continuing in that position until December, 1919, when he became operating manager of the Halifax Ship Yards Ltd., Halifax, N. S. In 1924 he was appointed manager of the operating department of the United States shipping board Emergency Fleet Corp., at New Orleans, and in 1925 was transferred to Washington as head of the revenue and expense section, later becoming assistant to the vice president of operations. In 1926 he joined the Black Diamond Steamship Corp., New York., as operating manager.

Mr. Paige has been closely connected with the development of pulverized coal fuel for marine use and for some months prior to his present connections he was attached to the pulverized coal division of the Todd Shipyards Corp., New York. Mr. Paige believes confidently in the future use of pulverized coal for marine purposes and that its economy, convenience and successful operation in marine boilers are now assured.



J. F. PAIGE

The late John Strachan, whose name is being perpetuated by the present firm, was well known in marine circles, having come from a family prominently identified with shipbuilding in Scotland. After serving his apprenticeship in Scotland he spent 15 years at sea and joined the Babcock & Wilcox Co. in 1913, spending four years in experimental work on coal, pulverized coal and oil. He served as general superintendent of machinery installation and outfitting at the Hog Island shipyard during the war and subsequently was connected with the International Products Steamship Co., A. H. Bull & Co. and the Black Diamond Steamship Corp. He opened his office as consulting engineer and surveyor in 1925.

Christopher Strachan son of the late John Strachan is a graduate of Stevens Institute of Technology, from which institution he received the degree of mechanical engineer Mr. Strachan has been connected with the American Locomotive Co. at their plant in Paterson, N. J. and with the Morse Dry Dock & Repair Co. in connection with the development of the Morse oil burning system. Upon leaving the Morse company, Mr. Strachan was associated with several companies in an experimental and sales engineering capacity in connection with equipment for burning both oil and pulverized coal as well as automatic combustion control equipment.



C. STRACHAN

At the time of his father's death, Mr. Strachan was assistant sales manager of Walter Kidde & Co., Inc. He resigned from this connection to become associated with Mr. Paige in the formation of the John Strachan Co.

Port Officers Appointed

Officers and other attaches of The Port of New York Authority were appointed under the reorganization plan at a meeting of the twelve commissioners on May 9.

Those named included the following: General manager, John E. Ramsey; chief engineer, O. H. Ammann; assistant general managers, Billings Wilson and John J. Mulcahy; general counsel, Julius Henry Cohen; associate counsel on tunnels, Paul Windels; secretary, Lawrence J. Keefe; treasurer, William Leary; assistant treasurer, Davis L. Waters; auditor, Marion Rodgers; superintendent of tunnel operation, E. Morgan Barradale; general superintendent.

Board Plans to Study Financing of Lines

The shipping board is about to undertake an extensive study of shipping security and methods of shipping finance, both in this country and abroad, in connection with the new construction program occasioned by ocean mail contracts. W. B. Gastonquay, newly appointed director of the board's bureau of finance and who has been connected with board and Merchant Fleet Corp. for more than 10 years will be in charge.

The shipping act stipulates as a function of the board that it "investigate the legal status of mortgage loans on vessel property with a view to means of improving the security of such loans and of encouraging investment in American shipping."

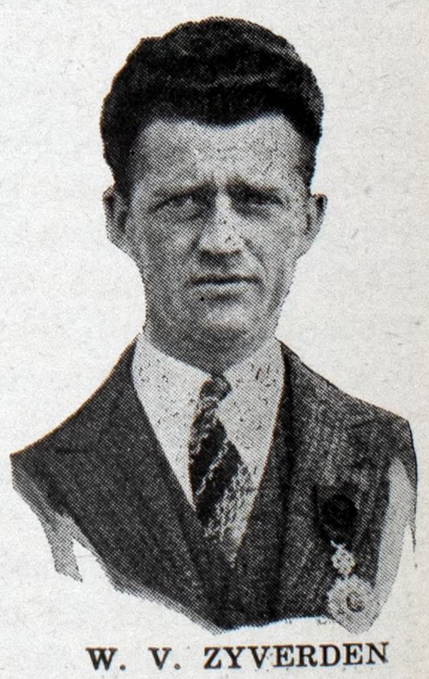
As one of the first steps in this study, it was pointed out by the board on May 19, Mr. Gastonquay will inquire into the methods of operation of marine insurance economies in this country and abroad. He also plans to compile data as to the amounts of insurance carried on hulls and cargoes, as well as the extent of reinsurance of American risks in foreign companies.

With regard to the subject of marine insurance, the law provides that the board shall ascertain "the number of companies in the United States, domestic and foreign, engaged in marine insurance; the extent of the insurance of hulls and cargoes placed or written in the United States, and what steps may be necessary to develop an ample marine insurance system.

W. S. Rugg, vice president in charge of engineering, recently was placed in charge of sales activities of the Westinghouse Electric & Mfg. Co., in addition to engineering activities. Mr. Rugg has also taken over the activities of Edward D. Kilburn, vice president and general sales manager.

Wins Decoration

William Van Zyverden, cruise director for the French line, who was created an Officer of the Nicham Iftikar, by the Bey of Tunis for his work in promoting North Africa to American tourists.



W. V. ZYVERDEN

How Waste Heat Can Be Utilized

Recover Waste Heat from Oil Engines—Boilers to Use Exhaust Gases Prove Practical — Importance of Design

By F. Johnstone Taylor

NOW that the oil engine, certainly so far as the larger units are concerned, has been brought down to a fuel consumption of 0.4 pounds and under, engine-owners are giving more attention to the recovery of some of the heat which passes away in the exhaust. In the large blast furnace gas engine installations which are a feature of European steelworks it has been the practice for a number of years to augment their output in this way and

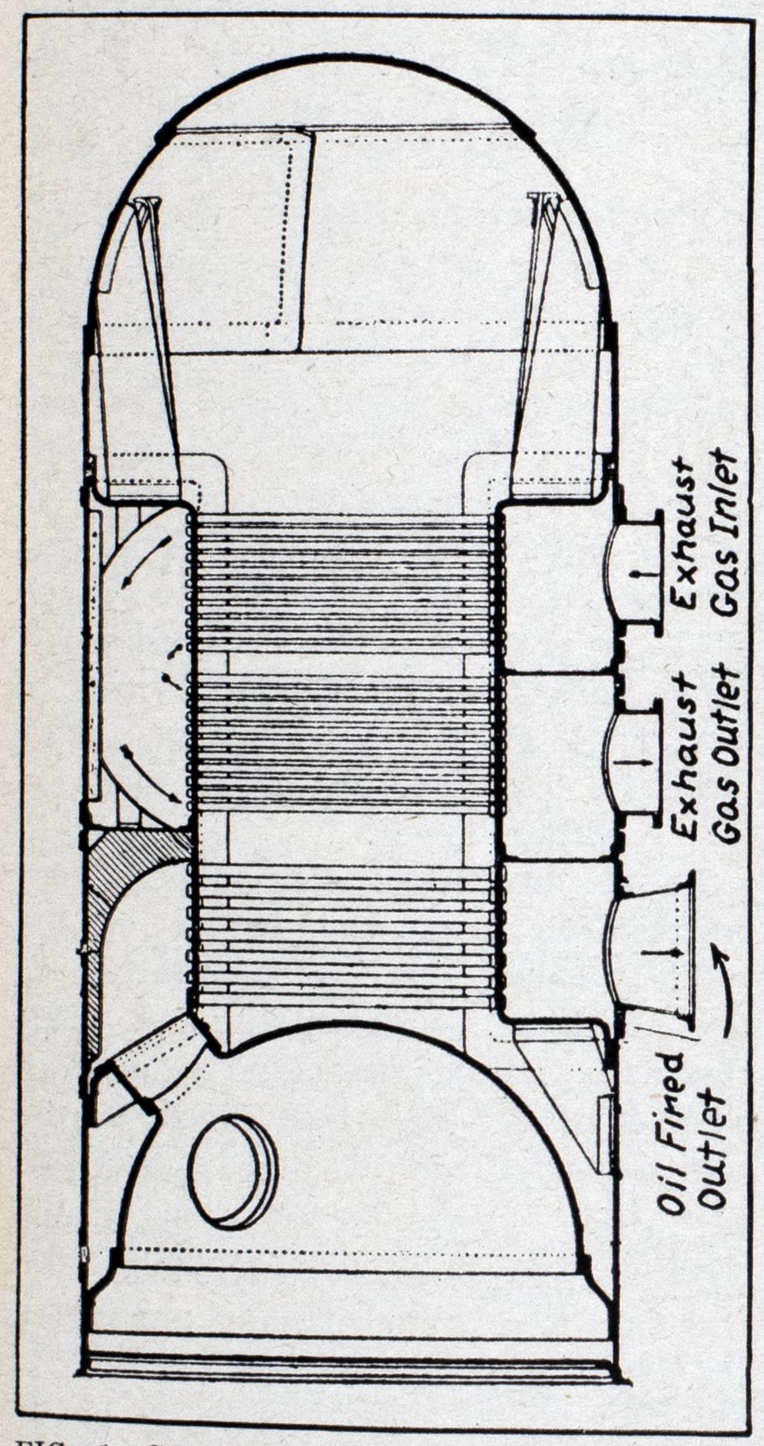


FIG. 1—COCHRAN EXHAUST GAS BOILER ARRANGED FOR SIMULTANEOUS EXHAUST GAS AND OIL FIRING

in a well conceived installation of this kind about one tenth of the total engine power is recovered in a steam turbine which may well amount to 1000 horsepower and over.

The first serious attempt to recover waste heat from oil engines and in particular marine oil engines was the Still engine, but it makes but slow progress. It has, admittedly, justified the claims made for it in practice, but it is a costly machine and it is somewhat complicated. So far as marine work is concerned there is always a good use for steam and the present practice is to install boilers heated by the exhaust gases under running conditions and so arranged that they can be oil fired in port. Such equipment is neither costly nor complicated, it does not take up much space as the boilers can be conveniently housed in the up takes and it shows very good results in practice.

Waste Heat Tubular Boilers

The waste heat boiler is a definite problem. To merely pass the exhaust gases through any available tubular boiler will not realize good results. To absorb heat from hot gases they must pass either through long small bore tubes which is the usual form of boiler used with the large blast furnace gas engine installations referred to or special types of boiler which have been evolved for this particular purpose. Of the latter, those which have proved a marked success in practice in Great Britain are the Cochran exhaust gas boiler and the Clarkson thimble tube boiler. The former as built for coal firing is a well known type of vertical boiler used for cranes, hoists contractors and plants. Its essential features are retained in the auxiliary boiler shown in Fig. 1.

Exhaust Gas Type of Boiler

This boiler is furnished with two upper nests of small bore tubes for waste heat recovery and a lower nest of tubes for oil firing, the latter being in direct communication with the furnace. All the tubes are secured between two common tube plates. The two upper nests have a total of 704, 1½-inch outside diameter tubes of which 96 are stay tubes, the total heating surface being 1390 square feet. The oil firing surface of the boiler has 102, 2½-inch outside diameter tubes and 29 stay tubes giving a total heating surface of 500 square feet. The grate area is 41 square feet and this particular type of boiler which is fitted with a low pressure air burner, is designed for 120 pounds pressure. Its compactness and suitability to the duty will be at once apparent.

The Clarkson boiler originated as a coke fired boiler for heavy road passenger vehicles before the petrol vehicle completely superceded it. Its peculiar but simple form is shown in Fig. 2 and its action will be readily apparent. The particular unit shown is arranged for waste heat recovery only, but the arrangement is essentially the same in those fitted with an auxiliary oil burner or burners these being placed in a refractory lined combustion chamber below the boiler. The center passage, it will

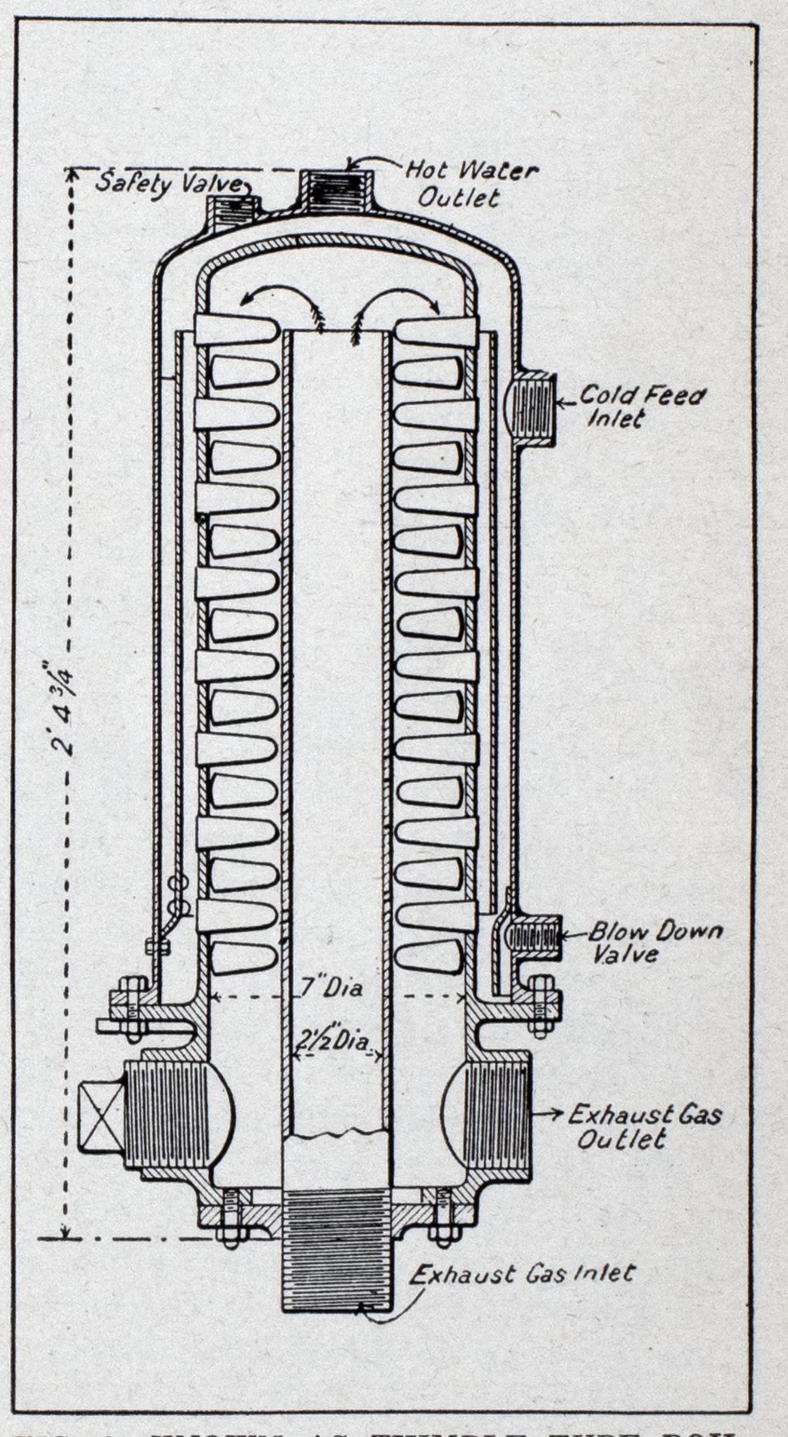


FIG. 2—KNOWN AS THIMBLE TUBE BOILER OF CLARKSON TYPE ARRANGED FOR WASTE HEAT RECOVERY ONLY

be observed, is closed by a core which compels the gases to pass among the tubes.

A turbulence is set up accompanied by the impingement of the gases at high velocity against the successive rows of inwardly projecting tubes or "thimbles." In addition to the turbulence of the gases outside the tubes, there is a percussive circulation of the water within them which keeps them clear of deposit at all times. In fact hard water can be used without forming scale and the incoming feed

which can, of course, be jacket water, is heated up to boiler temperature before coming in contact with the heating surfaces. A daily blown down and a fortnightly wash will keep these boilers in good condition for an unlimited period as the tubes rarely if ever leak or call for re-expanding. This is largely because there is complete freedom for expansion and the carbon deposits on the outside of the tubes can be burned off.

Some Underlying Principles

The reason why there are only two or three boilers which have really proved successful in the present connection is because they are the outcome of careful consideration of the special conditions called for in transferring heat by conduction as distinct from the radiation conditions encountered under direct fire-heat operation. The transfer of heat by conduction calls for a very large heating surface over which the hot gases travel at a high velocity so that the critical velocity at which stratification ceases and turbulent flow takes place is exceeded. Turbulence, whether it be set up by the high velocity of flow in long small bore tubes or by a suitable arrangement of the tube surfaces as indicated, results in the reduction of the inert insulating gas film adjacent to the heating surface, together with the continuous presentation of the hot gases to the heat absorbing surfaces.

When the gas velocity is below critical or its flow is non-turbulent the gas molecules tend to preserve their position from end to end of their travel, those nearer the core of the mass passing away without having parted with any large portion of their heat. Hence a primary condition in this type of boiler is turbulent flow.

From the large number of vessels now fitted with this class of equipment some interesting information is to be gleaned. For instance a Cochran boiler working in conjunction with a Doxford engine of 2000 horsepower evaporated 0.84 pounds of water per hour per brake horsepower from water at 60 degrees Fahr. to steam at 100 pounds pressure without any auxiliary firing. The exhaust gas temperature at entry was 710 to 715 degrees and at outlet about 400 degrees Fahr.

In the case of the British steamer SHEAFHOLM with a 1600 horsepower engine the exhaust gas boiler generating steam at 90 pounds operated continuously during the voyage a 12½ kilowatt dynamo and a general service bilge pump and as and when required other auxiliaries in the shape of fuel transfer pump, compressor, purifier, distiller, evaporator, etc.

For Clarkson boilers quite a large amount of data is now available. As applied to small engines, Professor Cook's experiments as recorded in *The Engineer* for April 15, 1927, are of considerable interest as they show that these boilers are a valuable adjunct to any small engine and that their usefulness is by no means confined to large units. In this type of boiler steam can be generated to the extent of 0.5 pounds per brake horsepower hour even when the exhaust gas temperature does not exceed 500 degrees Fahr. In the case of the tanker CALGORALITE with two 2500 horsepower Krupp engines each boiler generates 1000 pounds of steam per hour with exhaust gases not exceeding 500 degrees Fahr., their working pressure being 100 pounds and even with an exhaust gas temperature as low as 410 degrees Fahr. 690 pounds of steam was obtained. In the case of the tanker VANCOLITE having two Sulzer engines of a total of 3300 horsepower Clarkson boilers 4 feet in diameter by 8 feet high give an average of 1000 pounds of steam per hour at 65 pounds pressure when the gas temperature is in the neighborhood of 360 degrees Fahr., higher pressures being obtainable of course, with higher gas temperatures. And moreover this steam is always useful. It can drive the dynamos and then pass out to the evaporators and supply any heating systems or it can be used for the operation of turbo blowers when these are installed.

The latest arrangement is that of a duplex boiler arranged end to end in one casing. The upper boiler which has a somewhat smaller overall diameter is arranged as an exhaust gas boiler as shown in Fig. 2 only inverted while the bottom unit is arranged for oil firing with an internal refractory lined combustion chamber, the hot gases passing downwards through the tubes. In place, however, of the boilers having their own independent outer shells, the aforementioned casing forms a common shell so that not only is there a relatively large water space but both boilers can operate smultaneously or independently as required so that the steam output can be independent of the exhaust gas conditions. The complete set as built for engines of about 700 horsepower measures 12 feet 3 inches long by 4 feet 3 inches in diameter overall, the assumed exhaust gas temperature being 500 degrees Fahr. under ordinary conditions.

Great Lakes Red Book

THE Great Lakes Red Book, a vest-pocket directory giving the names of owners, operators, vessels and captains and engineers of all shipping on the Great Lakes is now out for the year 1930 *in its twenty-seventh annual edition. This convenient directory is published each year at Cleveland by* MARINE REVIEW *under the direction of A. H. Jansson, editor.*

The 1930 *edition of the Red Book lists over* 1200 *vessels of the Great Lakes together with the names of owner, operator, captain and engineer of each vessel. There is also a complete directory of the shipbuilding yards on the Great Lakes containing the names of all the principal officers and giving the drydock, repair and building facilities at each yard.*

Individual vessels and fleets are alphabetically arranged. The capacity of all ore carriers is given and there is also a complete port directory.

See Future for Welded Barge

The annual meeting of the American Welding society was held in the Engineering Societies building, New York, April 23-25. E. A. Doyle, consulting engineer, Linde Air Products Co., New York, was elected president. An interesting program of papers was presented, as well as discussions, including an illustrated paper by E. H. Ewertz, consulting engineer, New York, on the construction of a new type of all-welded barge which requires less welding than some of the existing types.

Those discussing this paper were enthusiastic over the future of the welded barge. A representative of the Federal Shipbuilding & Dry Dock Co. stated that nine completely welded barges had been built by his company and that the design used was such that nearly 75 per cent of the welding was done on automatic machines. He said with the increased cost of wood and the better engineering and lowered cost of welded steel barge construction, he expected to see practically all barges of welded steel design within four or five years. Certainly, he stated, this would be true of the larger sizes of barges.

Thomas M. Keresey, director of publicity and advertising of the International Mercantile Marine Co. for the past three years, resigned on May 1 to become associated with Lord & Thomas & Logan, advertising agents. Mr. Keresey will be succeeded by Robert R. Endicott, who was formerly connected with the advertising department of General Motors Corp.

Patents Show Marine Development

Latest Marine Inventions Described

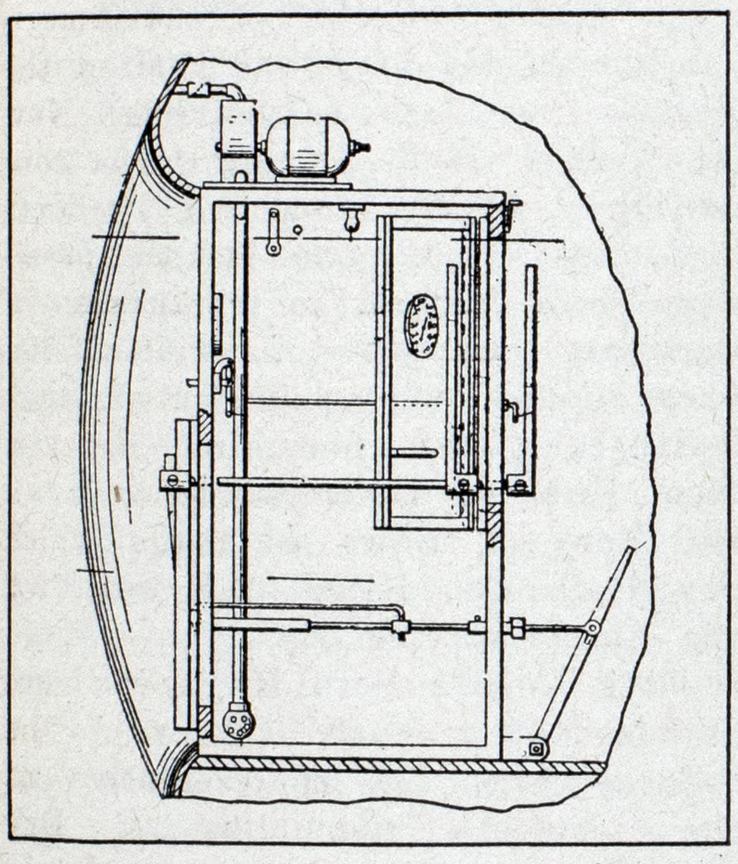
Specially Prepared for Marine Review

By Richards and Geier

Patent Attorneys, 274 Madison Avenue, New York

THIS invention relates to improvements in safety apparatus for boats. It is designed to enable the escape of the occupants of a sunken boat, and is particularly well adapted for use in submarines which are sunk and unable to rise to the surface.

One of the objects of the invention is to provide a novel apparatus of the kind described, which is simple, cheap to install, which is durable, not likely to get out of order, which is efficient in operation, and which will enable the occupants of a sunken boat to easily escape therefrom or permit divers to enter the boat, without cutting through the hull and without liability of flooding the boat.

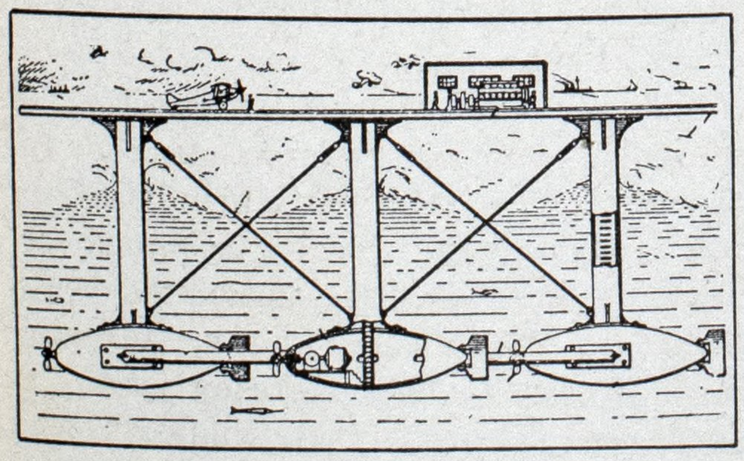


SAFETY APPARATUS FOR BOATS

United States Patent No. 1,752,354, issued April, 1930, to Fred A. Sieverling, of Great Bend, Kansas.

THIS invention relates to ocean going water craft especially designed for rough water use.

Objects of this invention are to provide ocean going water craft of great stability, which are better adapted to combined air and sea borne trade and which combine greater speed, with safety than is possible with present styled water craft.

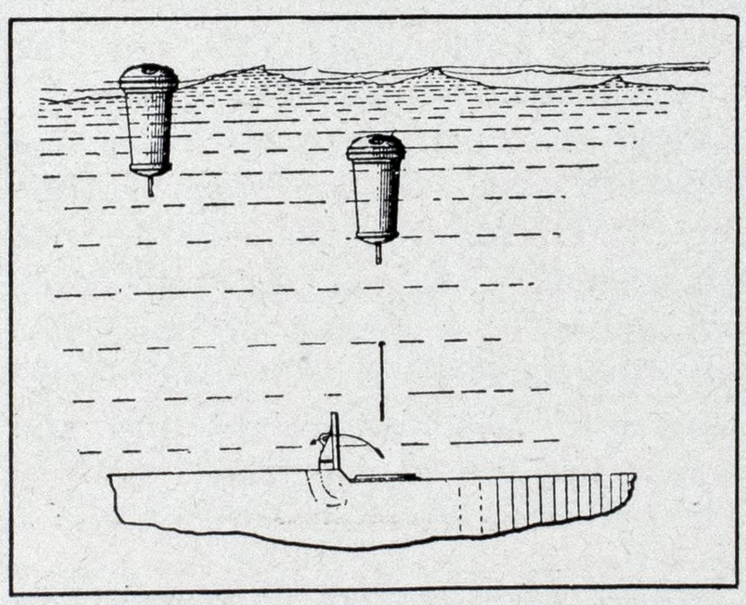


OCEAN-GOING WATER CRAFT

United States Patent No. 1,752,354, issued April 8, 1930, to William R. Blair, of Washington, D. C.

WE HAVE made arrangements with the patent attorneys, Richards & Geier to publish data relating to letters patent issued in the United States covering inventions which may be of particular interest to our readers. The patents described, some of which have accompanying cuts partially illustrating the inventions, are all of recent date and we are planning, in subsequent issues, to publish similar information on patents pertaining to various phases of marine development work. Should our readers be interested in obtaining a printed copy of any of the patents appearing in this issue, or any other patent desired, such copies may be had by addressing request to the editor or direct to the contributors of this page.

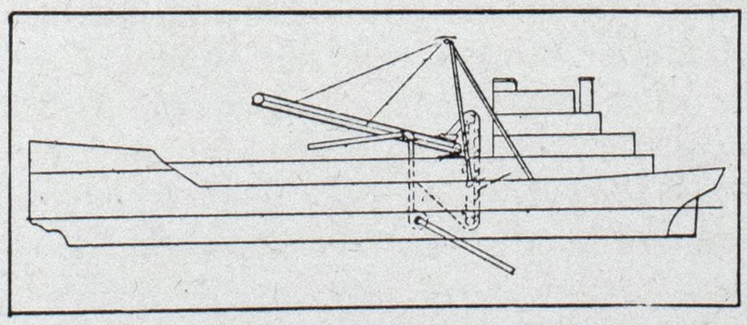
THIS invention relates to apparatus for permitting the exit or escape of the occupants from a submarine vessel while submerged, particularly when life is endangered by sinking and disablement of the vessel below the surface.



SUBMARINE ESCAPEMENT APPARATUS

United States Patent No. 1,754,690, issued April 15, 1930 to Joseph E. Martin and Percival A. Martin, of Newark, N. J.

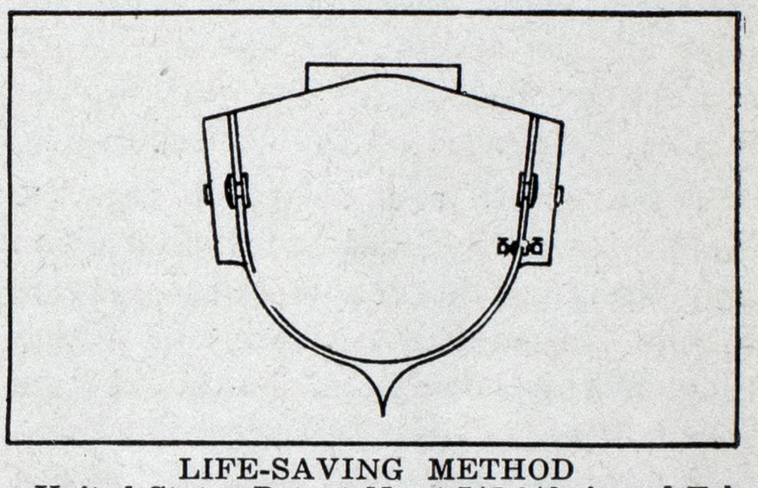
THIS invention relates to means for unloading sand, gravel, or similar bulk cargo from the cargo deck or hold of a boat, and for discharging the same to a point beyond the beam, on either side, and within limits, at any desired elevation.



BOAT-UNLOADING MECHANISM

United States Patent No. 1,754,824, issued April 15, 1930 to Edward M. Graves, of Cleveland Heights, Ohio.

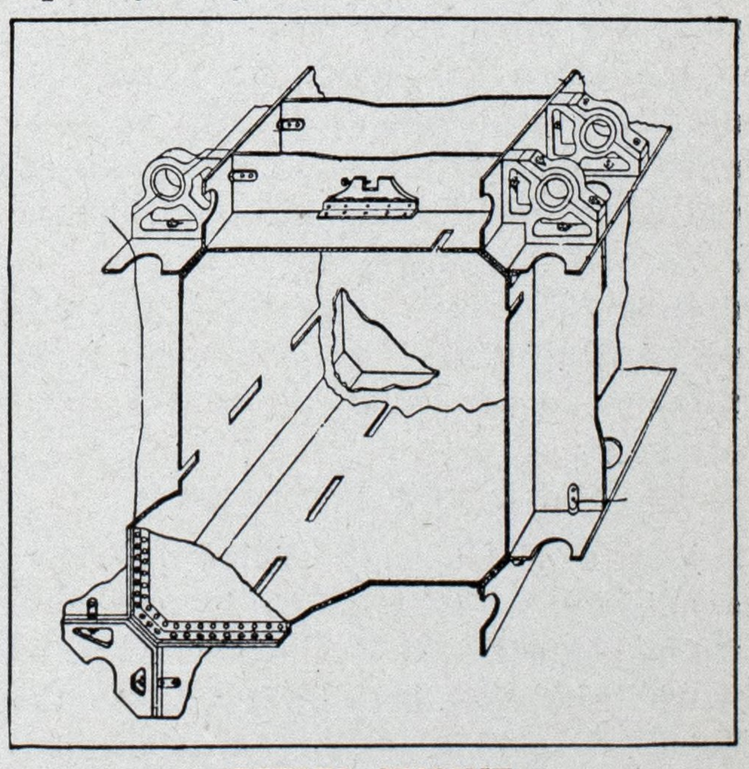
THIS invention relates to a safety chamber for submarines destined for serving as a life-saver for the crew thereof. The characteristic of the invention resides in using a part of one of the existing water-ballast tanks, normally operating as an ordinary water-ballast tank, for lodging the crew therein after it has been emptied. The part of the water-ballast tank in question therefore constitutes, a movable reservoir which may be detached from the submarine, and by reason of Archimedes principle, rises immediately to the surface. The invention provides means destined to fix the said movable water-ballast tanks upon the shell of the submarine, the means and devices for emptying such reservoirs and finally the means for detaching the same.



LIFE-SAVING METHOD

United States Patent No. 1,747,943, issued Feb. 18, 1930, to Ernest Paul Laurent, of Reims, France.

THIS invention relates to internal combustion engines particularly of the opposed piston type, and it has for its object to provide an engine of the character designated which shall embody any desired number of sets of engine units, each set consisting of an even number of engine units having substantially similar cylinders arranged to deliver their power to a common driven element, whereby an engine of extreme lightness and flexibility of capacity may be secured.



DIESEL ENGINE

United States Patent No. 1,701,363, issued Feb. 5, 1929, to Herbert T. Herr, of Merion, Pa.

Latest Data on New Marine Work

Information on New Ships Ordered—Building and Repair Contracts Let—Shipping Board Loans Made, Authorized or Pending

THE shipping board on May 21 authorized construction loans to aid in building the two largest merchant ships yet contracted for in an American shipyard. The vessels will be built for the Transatlantic Steamship Corp. and the North Atlantic Steamship Corp., subsidiaries of the United States Lines, Inc., and will be built by the New York Shipbuilding Co., at its yard in Camden, N. J. Contracts covering the construction already have been agreed upon by the owner and builder, and the board has been advised that work will proceed forthwith.

The amount of the loans will aggregate $15,750,000 for the two ships, the total cost of construction being $21,000,000. This latter figure was the offer of the builder as the result of competitive bidding on the part of the leading shipyards of the United States.

These ships are designed for the North Atlantic-Continental European and Hamburg-Bordeaux range service of the United States lines, for which they will be completed in about two years time. Their construction will not, however, have any bearing on the agreement made by the United States lines at the time the line was purchased to build two 45,000-ton express liners of 28-knot speed for the New York-Channel ports run.

The ships for which the loans were granted today, will be 705 feet in length, 86 feet beam, propelled by twin screws, driven by geared turbines, or by turbo-electric combination. They will be of about 30,000 gross tons and will have sea speeds of 20 knots, which compares very favorably with vessels of similar type in the trade for which they are designed. Accommodations will be provided for 600 first class, 490 tourist, and 200 third class passengers. These loans will be repaid in 20 annual installments with interest, payable semi-annually, at the minimum rates provided in the Jones-White act.

Loan for Tankers

A loan of $6,328,125 in aid of constructing five tankers to be operated in the oil carrying trade was granted by the shipping board May 14 to the Motor Tankship Corp. of Philadelphia.

This loan which represents approximately three-fourths of the construction cost of the vessels is from the construction loan fund created by the Jones-White law. It was stated that the vessels are to be built by the Sun Shipbuilding & Dry Dock Co. at its yards in Chester, Pa. They will be diesel driven and will be approximately 13,600 tons deadweight, with a speed of 11 knots. With the contracts already agreed upon, the work on the new vessels is to start immediately.

To Convert Bremerton

The shipping board on April 30 authorized the sale of the steamer BREMERTON to the Bulk Transportation Corp., New Orleans, for $25,000 cash, under an agreement by the purchaser to convert the vessel to a self-discharging bulk ore carrier which will be equipped to burn pulverized coal. The purchaser also agrees to install a stream line rudder. The estimated cost of these improvements is $400,000, and the sale agreement is contingent upon the award by the board of a construction loan covering three-fourths of this outlay.

After the vessel is made ready for operation, the Bulk Transportation Corp. will furnish the board with performance data on the pulverized coal units for a period of one year. The BREMERTON is a steel cargo steamer of 7390 deadweight tons and is now laid up at Norfolk.

Open Bids for Cunarder

According to Sir Ashley Sparks, resident director for the Cunard line in United States, bids were received from British shipbuilders May 11 for the construction of the huge vessel with which the Cunard line hopes to regain its prestige of operating the fastest liner in transatlantic service.

This new vessel which has been widely discussed both here and abroad in shipbuilding circles, if operated at its alleged 32-knot speed, would make a crossing from Southampton and Cherbourg to New York in four days flat, 17 hours faster than the best time made by the BREMEN or EUROPA.

Reports received from abroad placed the tonnage of this proposed liner at 75,000 tons. The length is to be 1000 feet and the beam 115 feet. Luxurious accommodations are planned for 4000 passengers in the various classes. A crew of 1200 men will be required to man the vessel.

It is expected that the contract for building the new liner will be let as soon as possible, but even providing the order is placed in the near future the belief is that the vessel will not be ready for service before the summer of 1933. It is understood that either John Brown & Co. of Clydebank or Swan, Hunter & Wigham Richardson will be awarded the contract.

To Build Six Ships

Loans in aid of building six combination passenger cargo vessels for the United Mail Steamship Co., a subsidiary of the United Fruit Co., Boston, were authorized by the shipping board May 21 in the maximum aggregate amount of $15,412,500. These loans will represent three-fourths the cost of building the six ships, three of which will be built at the Newport News Shipbuilding & Dry Dock Co., Newport News, Va., and three at the Bethlehem Shipbuilding Corp.'s Fore River yard at Quincy, Mass.

Three of the new ships will be operated between San Francisco and Puerto Armuellas and the other three will be operated between New York and Port Limon. All of the ships will be of 16 knots speed, 447 feet in length, 60 feet beam, by 24 feet draft and will have deadweight tonnage of 4000 tons each. They will be equipped with turbo-electric machinery and will be propelled by twin screws. These loans will be repaid in 20 annual installments with interest, payable semi-annually, at the minimum rates provided in the Jones White Law.

Tanker to Have Trials

Sea trials of the VEEDOL No. 2, second coastwise, diesel-electric tanker for the Tide Water Oil Co., took place May 8 at the plant of the Pusey & Jones Corp. in Wilmington, Del., where the ship was built. Like the first vessel, now in service, the new tanker will carry approximately 20,-

000 barrels of gasoline and approximately 55,000 gallons of lubricating oil. Her route will be along the Atlantic coast and she will carry a crew of 18 men.

McCormick Vessel Plans

Angelo Conti, naval architect, has been in conference with officials of the McCormick Steamship Co. in regard to plans for the construction of five or seven combination passenger and cargo vessels for operation in the Pacific-Argentine-Brazil service of the company for which the vessels are to be especially designed. The type of propulsion has not yet been decided upon.

New Line Authorized

The shipping board on April 22 authorized the sale to the Roosevelt Steamship Co. Inc., New York, of five 11,773-ton vessels to be reconstructed and used for the establishment of a new passenger and cargo service between Baltimore and Hampton Roads and Bremen and Hamburg, with the privilege of calling at French Atlantic and channel ports. In authorizing the Merchant Fleet Corp. to proceed with this sale, the board declared the route described to be an essential trade route as defined by the merchant marine act of 1920 and acted in co-operation with the postmaster general who already has awarded the Roosevelt company an ocean mail contract covering this service.

The board authorized the sale on the basis of $30,000 cash for each ship, but it will be provided in the contract of sale that the ships will be reconstructed to increase their speed to 16 knots and provide accommodations for approximately 100 passengers. This reconstruction will involve the modification of the hull lines of the ships and the substitution of new engines of considerably increased power. The details of plans covering these changes will be presented to the Board for its approval when it considers the final contract of sale, which will be dependent upon the authorization by the Board of a construction loan in aid of rebuilding the vessels.

Contract for Carferry

Contract for the construction of a new steel carferry which is to cost approximately $1,000,000 has been awarded to the Manitowoc Shipbuilding Corp. by the Grand Trunk-Canadian National system. The new vessel, which is to replace the MILWAUKEE which was lost in the disastrous storm of last October, will have an overall length of 360 feet, a beam of 56 feet and displacement of 2550 gross tons. The capacity of the tracks will be 30 freight cars. There will be passenger space for 200 and a crew of 50. Twin screw propulsion with two sets of steam engines will probably make this one of the fast ships of its kind on the Great Lakes.

Lighthouse Tender Bids

Bids for the construction of a new diesel electric lighthouse tender to be known as the LINDEN were opened recently in Washington, according to the lighthouse service of the department of commerce. It is expected that the contract will be awarded shortly. Separate bids for hull and for machinery were asked for. Bids for the hull ranged from $127,500 to $290,000; bids for the machinery from $38,333 to $46,847.

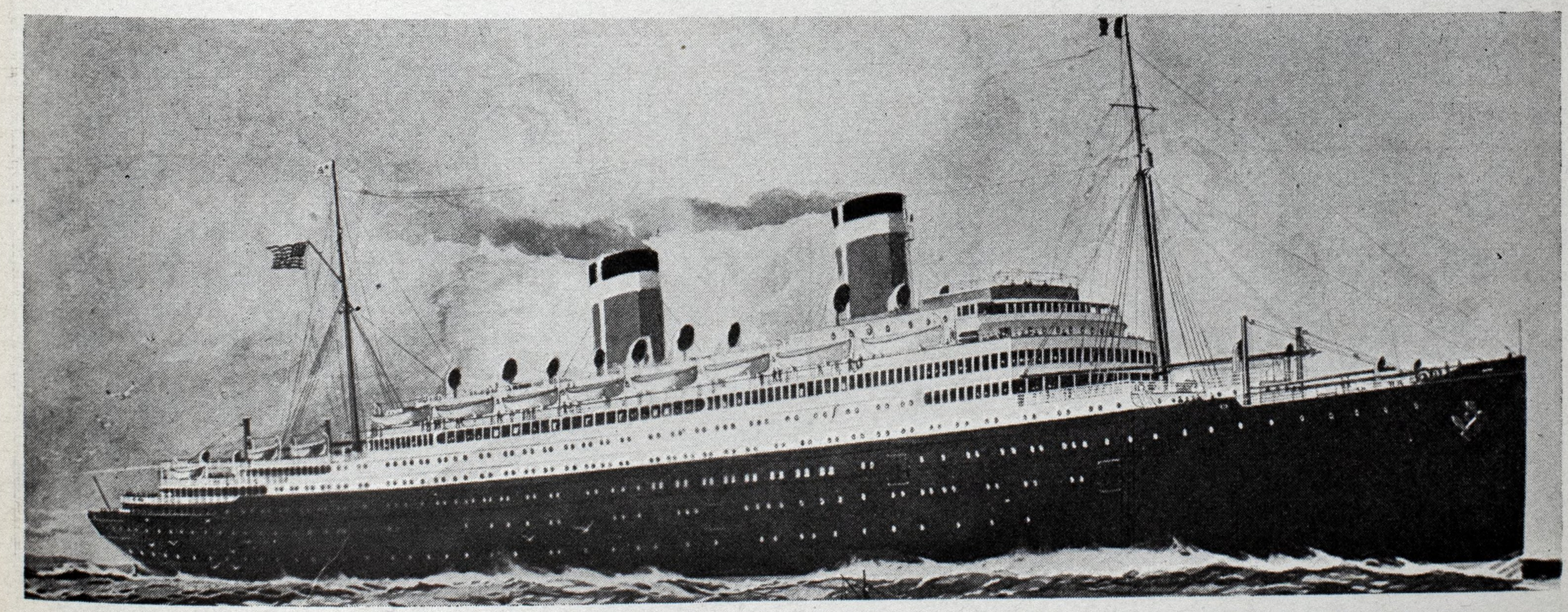
The lighthouse tender LINDEN is to be 121 feet long, built of steel and powered with full diesel engines, generating current for the double armature electric motor driving the propeller shaft. The vessel will be of shallow draft for operation in the sounds of North Carolina and the tributary waters of Chesapeake Bay.

Eastern Steamship Bids

Bids for the construction of three steamers with a speed of 20 knots and accommodations for 600 passengers each are being considered by directors of Eastern Steamship Lines Inc. Bids were submitted by the Bethlehem Shipbuilding Corp., Newport News Shipbuilding & Dry Dock Co., Sun Shipbuilding & Dry Dock Co., Federal Shipbuilding & Dry Dock Co., United Dry Docks Inc. and the New York Shipbuilding Co. One vessel is to be operated between Boston and St. John, N. B., another between Boston and Yarmouth, N. S., and the third between New York and Norfolk in summer and between Miami and Havana in winter. It is expected that awards will be announced in a short time.

Lay Keel With Ceremony

The old rite of keel-laying, a rare ceremony since the days of clipper ships, was revived on May 17 at the Fore River yard of the Bethlehem Shipbuilding Corp. when the keel of the first of the two 25,000-ton passenger liners to be built for the Matson Navigation Corp., San Francisco, was laid. Representative Wallace H. White Jr. of Maine, Lieut. Gov. Youngman and Mayor Curley of Quincy, Mass., shot from electric guns the first three red-hot rivets into the keel, which will be 638 feet long. The building program assures work for 3500 men at the plant for the next three years.



Artist's Drawing of 705-Foot Liners to Be Built by the New York Shipbuilding Co. for the United States Lines, Inc.

Ship Construction Loans

WITH the award of construction loans to the United States lines and the United Fruit Co., May 21 the shipping board brought the total amount to be advanced for the construction of new ships for foreign trade routes up to more than $93,000,000, and has thus provided, under the authorization of the Jones-White law, for the building of 34 modern merchant vessels in American shipyards at an aggregate cost of about $125,000,000. In addition to these loans for new construction, the board also has authorized loans aggregating $2,972,352.50 for reconstruction and improvement of 12 vessels engaged in private American shipping enterprises.

Of the 34 new ships to be constructed with the aid of loans already granted, 22 will be of the passenger-cargo type, and 12 will be tankers. Of the passenger vessels, six, including two for the United States lines, 2 for the Dollar lines, and 2 for the Oceanic Steamship Co., will have speeds of 20 knots, and ten of the vessels will have speeds of 18 knots.

The complete list of loans thus far awarded under the terms of the Jones-White act are given as follows:

American Line Steamship Corp., New York; Combination cargo and passenger vessel, 15,300 deadweight tons, 18 knots speed. Steamer PENNSYLVANIA, Newport News Shipbuilding & Dry Dock Co. Loan, $5,250,000. (Delivered)

American South African Line, Inc., New York; Combination cargo and passenger vessel, 9400 deadweight tons, 13 knots speed. Total loan $1,350,000; Hull 116, Sun Shipbuilding & Dry Dock Co. (Delivered)

Grace Steamship Co., New York; Combination cargo and passenger vessel, 6800 deadweight tons, 18 knots speed. Total loan $2,454,750, New York Shipbuilding Co., delivered.

The Agwi Navigation Co., New York; two combination cargo and passenger vessels, 5700 deadweight tons, 18 knots speed. Total loan each vessel, $3,262,500, hulls 337 and 338, Newport News Shipbuilding & Dry Dock Co.

Dollar Steamship Co., San Francisco; two loans granted for two combination passenger and cargo vessels, 15,000 deadweight tons, 20 knots speed. Total loan $10,575,000 for both vessels; hulls 339 and 340; Newport News Shipbuilding & Dry Dock Co.

Export Steamship Corp., New York; Combination cargo and passenger vessels, four, 9400 deadweight tons, 15 knots speed. Total loan $6,900,000 for four vessels including hotel equipment. New York Shipbuilding Co. Two now underway.

Oceanic Steamship Co., San Francisco; two loans granted for two combination passenger and cargo vessels, 11,300 deadweight tons, speed 20 knots. Total loan $11,700,000 both vessels, hulls 1440 and 1441; Bethlehem Shipbuilding Corp. Ltd.

Coamo Steamship Corp., New York; Loan for one combination passenger and freight vessel, 4500 deadweight tons; speed 15½ knots. Total loan $1,896,000; hull 1432; Bethlehem Shipbuilding Corp., Ltd.

Motor Tankship Corp., Philadelphia; Five loans granted for five tankers, hulls 120, 122, 123, 124 and 131. Each loan, $1,260,937.50; Sun Shipbuilding & Dry Dock Co.; 13,450 deadweight tons. (Two delivered)

Tidewater Associated Transport Corp., New York; Two loans granted for two tankers, 13,450 deadweight tons, Sun Shipbuilding & Dry Dock Co. Each tanker, $1,301,025.

Motor Tankship Corp., Philadelphia; Five loans for five tankers—13,500 deadweight tons each; speed 11 knots; each loan $1,265,625; Sun Shipbuilding & Dry Dock Co.

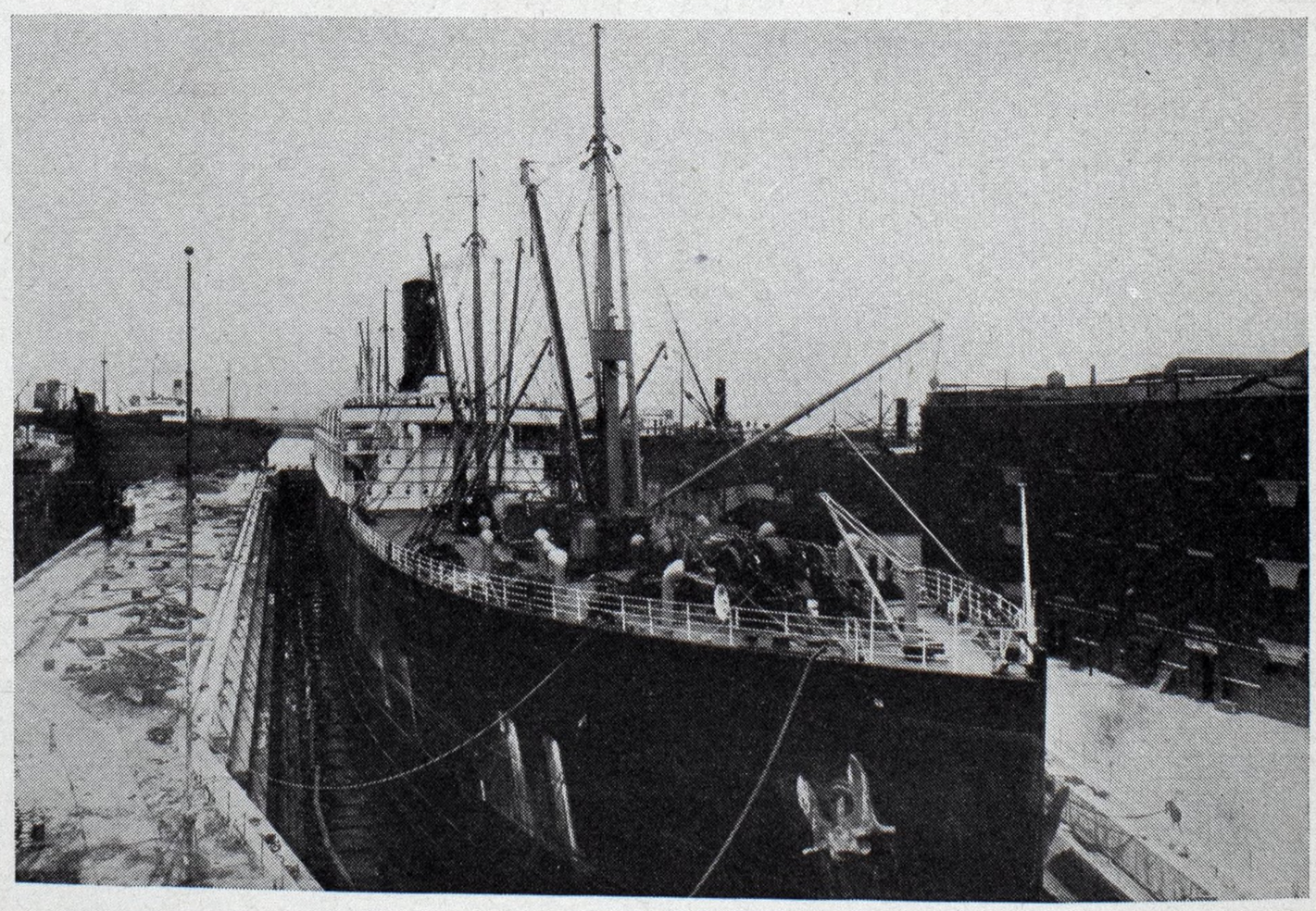
United States Lines, Inc., New York; Two loans for two passenger and cargo vessels, approximately 20,000 gross tons; speed 20 knots; total loan $15,750,000 for both vessels; New York Shipbuilding Co.

United Fruit Co., Boston; Six loans for six vessels, 4000 deadweight tons each; speed 18 knots. Total loan $15,412,500 for all six; three to be built by Newport News Shipbuilding & Dry Dock Co., and three by Bethlehem Shipbuilding Corp. Ltd.

Big Dry Dock Has Handled Many Vessels

THE steamship PRESIDENT JOHNSON of the Dollar line, which was recently dry docked in the new Todd dock at the Robins plant of the Todd Shipyards Corp., is the seventieth vessel to have entered the new dock since it was opened for service four and a half months ago. During this time more than three-quarters of a million tons of shipping have been handled in the dock, which is the largest in New York harbor, and the largest privately owned dock of its type on the Atlantic seaboard.

Ships of all kinds and sizes have been visitors to the dock, some being taken care of in the inner section of the gate seat while the larger vessels occupied the major part of the dock's total overall length of 750 feet.



Marine Business Statistics Condensed

Record of Traffic at Principal American Ports for Past Year

New York

(Exclusive of Domestic)

Month	—Entrances— No ships	Net tonnage	—Clearances— No ships	Net tonnage
April, 1930	558	2,662,532	574	2,601,047
March	546	2,490,027	562	2,470,228
February	508	2,280,543	512	2,272,393
January	542	2,506,444	572	2,658,125
December	517	2,331,342	518	2,257,424
November	520	2,236,677	537	2,387,932
October	564	2,591,207	561	2,561,403
September	577	2,642,897	567	2,548,764
August	584	2,537,306	626	2,775,730
July, 1929	580	2,648,419	588	2,582,929

Philadelphia

(Including Chester, Wilmington and the whole Philadelphia port district)
(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
April, 1930	89	236,257	63	177,289
March	96	285,754	58	190,093
February	86	248,417	67	194,809
January	94	281,558	66	202,453
December	87	237,510	49	143,761
November	80	222,026	48	133,872
October	99	262,305	62	154,401
September	107	282,105	61	145,895
August	110	271,857	54	120,595
July, 1929	120	321,726	70	188,269

Boston

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
April, 1930	105	298,347	76	203,497
March	85	271,423	57	193,317
February	87	281,012	44	159,767
January	93	306,097	42	128,581
December	95	286,749	62	208,978
November	101	332,269	67	221,318
October	95	310,386	56	196,590
September	139	387,061	106	265,839
August	139	387,061	106	265,839
July, 1929	151	376,620	109	327,487

Portland, Me.

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
April, 1930	17	47,308	20	52,313
March	16	45,201	21	59,234
February	26	71,155	21	57,834
January	27	72,734	26	71,929
December	22	47,329	23	51,644
November	26	51,231	26	50,475
October	25	54,402	25	56,022
September	30	58,497	30	64,559
August	32	59,299	31	58,111
July, 1929	31	55,932	31	53,761

Providence

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
March, 1930	7	31,668	5	23,382
February	12	44,382	7	28,774
January	13	48,880	5	24,055
December	10	35,615	4	16,406
November	10	38,203	6	22,371
October	6	20,741	8	32,974
September	9	38,226	5	23,339
August	6	24,438	6	25,315
July	12	38,408	9	29,585
June, 1929	11	40,920	7	31,040

Portland, Oreg.

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
March, 1930	26	103,710	44	159,420
February	31	123,100	47	185,192
January	31	122,031	44	165,208
December	39	146,486	53	118,117
November	34	129,809	65	234,575
October	39	148,172	59	221,007
September	33	129,576	52	191,302
August	45	166,207	65	229,834
July	42	151,702	54	198,109
June, 1929	30	109,084	47	170,643

Baltimore

(Exclusive of Domestic)

Month	—Entrances— No ships	Net tonnage	—Clearances— No ships	Net tonnage
April, 1930	166	502,204	179	529,912
March	141	438,638	139	433,168
February	139	432,422	142	431,664
January	131	422,932	135	435,506
December	134	415,201	134	425,362
November	132	438,274	137	446,120
October	138	450,603	146	463,723
September	117	374,893	108	355,532
August	141	444,315	150	466,464
July, 1929	160	499,292	158	485,913

Norfolk and Newport News

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
April, 1930	14	35,914	61	178,792
February	21	47,835	59	180,510
January	13	27,927	75	208,959
December	30	75,636	58	164,287
November	39	50,600	79	204,216
October	32	87,466	79	209,997
September	27	67,040	74	189,010
August	32	86,983	95	256,104
July	32	74,562	97	220,215
June, 1929	23	39,983	78	160,520

Jacksonville

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
April, 1930	13	23,378	13	27,999
March	17	26,625	12	23,963
February	14	35,002	13	31,353
January	12	24,225	16	31,722
December	19	36,831	12	20,409
November	10	22,938	10	18,750
October	12	20,268	8	19,134
September	17	36,618	13	23,731
August	18	45,422	10	15,617
July, 1929	12	21,338	12	22,111

Key West

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
April, 1930	89	90,105	82	90,249
March	93	89,490	76	86,235
February	85	90,050	70	87,109
January	74	86,081	71	85,990
December	68	78,984	65	78,634
November	84	97,555	83	97,217
October	74	88,850	75	88,853
September	55	64,464	59	72,321
August	60	70,851	60	68,913
July, 1929	72	84,674	67	80,233

Mobile

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
April, 1930	115	225,516	119	235,115
March	131	280,484	126	286,119
February	104	254,408	116	276,137
January	118	281,672	108	256,384
December	110	262,685	101	238,149
November	107	231,376	111	259,712
October	123	304,950	119	294,276
September	91	208,323	83	213,660
August	96	233,785	83	193,379
July, 1929	110	267,053	109	264,552

Seattle

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
April, 1930	55	230,429	55	217,705
March	52	205,674	59	245,363
February	55	231,213	47	195,156
January	51	229,516	55	246,266
December	57	292,419	62	302,713
November	68	278,207	73	306,493
October	72	293,569	68	277,041
September	46	203,192	47	203,236
August	62	258,910	63	263,569
July, 1929	64	259,303	62	252,021

New Orleans

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
March, 1930	255	703,361	263	699,493
February	263	715,681	237	630,673
January	252	706,945	260	715,903
December	273	772,310	279	785,160
November	268	736,452	269	739,461
October	244	681,983	261	713,490
September	257	684,203	260	698,665
August	272	726,363	273	721,024
July	279	712,324	288	741,716
June, 1929	277	708,089	273	711,898

Charleston

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net. tonnage	—Clearances— No. ships	Net tonnage
April, 1930	22	49,651	26	56,022
March	32	70,250	24	60,834
February	20	52,660	18	44,494
January	25	61,031	22	58,857
December	16	42,198	19	46,455
November	24	62,691	27	75,588
October	24	62,345	25	65,733
September	19	52,795	12	32,870
August	17	37,818	15	29,341
July, 1929	11	21,622	10	20,558

Galveston

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
April, 1930	26	39,332	66	183,706
March	24	31,987	82	235,656
February	26	48,200	68	197,140
January	30	77,176	87	274,299
December	27	65,306	104	358,823
November	28	68,030	108	332,315
October	36	88,056	118	385,367
September	47	131,512	101	323,955
August	37	87,502	74	275,017
July, 1929	36	72,793	87	259,450

Los Angeles

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
April, 1930	214	639,153	200	637,922
March	211	682,547	218	677,011
February	177	580,092	165	542,392
January	185	601,710	176	596,007
December	212	619,119	178	589,551
November	225	676,209	215	664,661
September	259	621,704	225	605,808
August	204	583,568	185	554,520
July, 1929	203	705,042	169	620,250

San Francisco

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
April, 1930	161	555,903	156	569,368
March	179	710,763	150	631,782
February	142	565,514	135	567,268
January	158	644,015	149	630,336
December	182	632,677	148	558,136
November	161	620,878	143	579,803
October	179	696,620	164	667,367
September	151	563,770	134	559,772
August	196	723,330	168	669,499
July, 1929	173	680,770	153	621,762

Port Arthur

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
April, 1930	18	60,745	20	60,563
March	19	58,652	24	65,593
February	16	46,488	16	43,414
January	15	42,725	23	69,678
December	21	60,843	20	57,783
November	22	76,862	21	66,067
October	13	45,041	20	58,624
September	21	71,932	21	74,402
August	21	76,420	24	76,700
July, 1929	16	58,233	20	71,457

Note: The figures given in this table are for direct entrances and clearances. Additional vessels in foreign trade enter and clear from and to other American ports after original entry and before final departure. At the port of Philadelphia, for instance, additional vessels in the foreign trade in this category were 67 of 234,788 net tons entered and 73 of 237,779 net tons cleared for the month of April.

What the British Are Doing

SPEAKING at the annual meeting of Cammell Laird & Co. Ltd. Chairman W. L. Hichens, said the Birkenhead shipbuilding yard was far more efficient today than ever before and challenged comparison with any other yard in the country. They were doing work of great importance to Merseyside and they demonstrated they could build ships as economically and efficiently as any other in the United Kingdom. The shipbuilding outlook was not at all good. General trading was depresed and everyone in the basic industries was experiencing a difficult uphill struggle. It was well known that the capacity of British shipyards was largely in excess of the present and indeed of any probable demand with the result that competition was very keen and prices had been cut to a very fine point. The Birkenhead shipyard had been well employed during the last year and although the actual tonnage launched was less than in 1928 the volume of work done was greater.

* * *

HARLAND & WOLFF have launched at Belfast the motor liner WARWICK CASTLE for the South African service of the Union Castle Mail Steamship Co. The new vessel has a tonnage of 20,500 tons and her dimensions are: length 650 feet, breadth 75 feet, depth 44½ feet. She has a cruiser stern and two low funnels. Luxurious accommodation is provided for 760 first, second and third class passengers. The propelling machinery consists of two 8-cylinder double acting 4-stroke engines of the Harland B. & W. type.

* * *

SHIPBUILDING on the Clyde has received a setback within the last month, only one comparatively small contract being announced. It is therefore inevitable, unless there is an early improvement in shipping, that the yards will experience a slack time during the summer and autumn. There were launched in Scotland in April, 30 vessels of approximately 35,000 tons, and it was lower than any previous month this year. The total for the four months was 62 vessels as compared with 64 in the corresponding period of last year and 76 in the best corresponding period on record. Other parts of the country are in the same position as the Clyde and shipbuilders in all areas are finding difficulty in obtaining work.

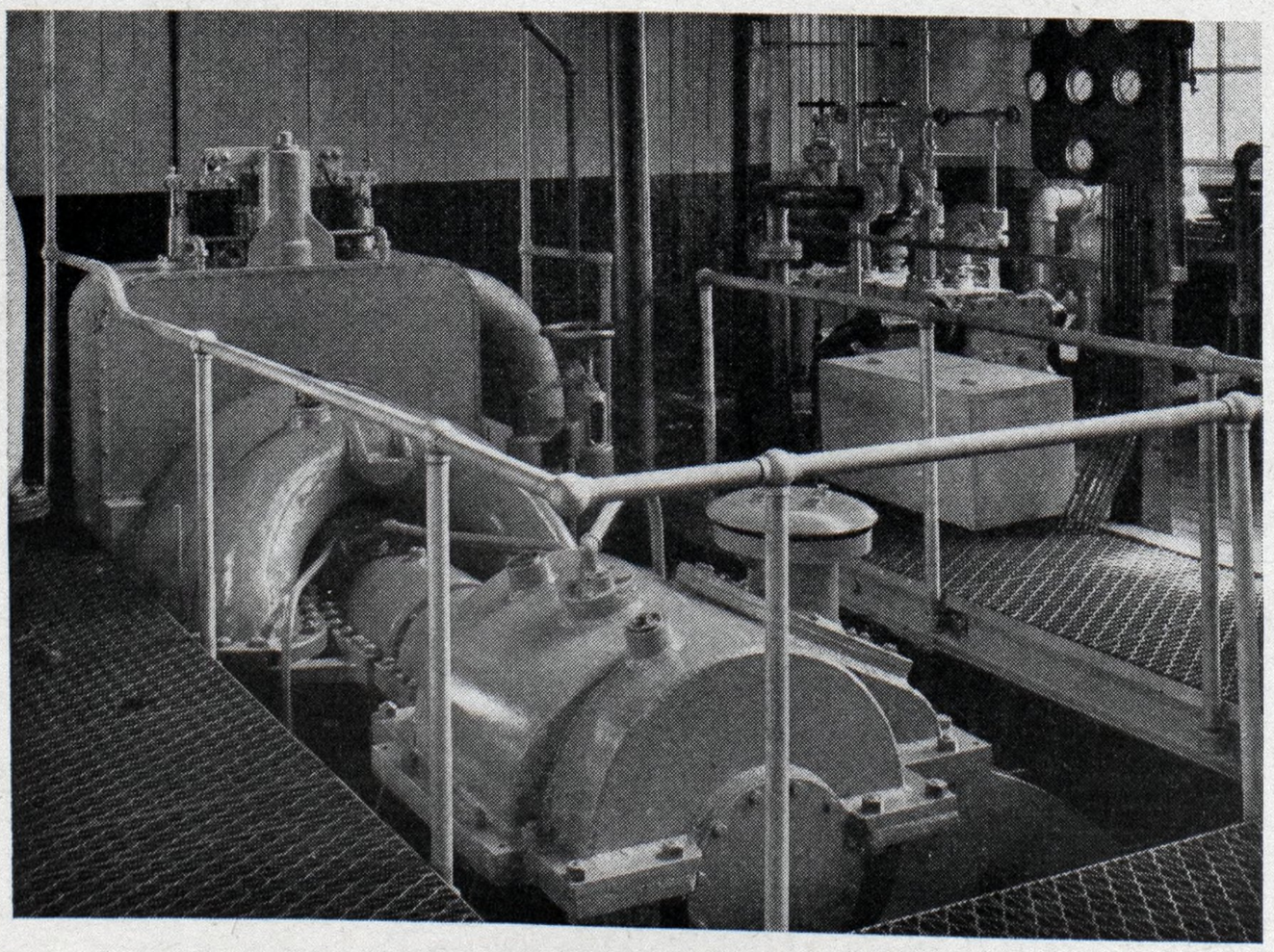
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THE Prince of Wales, just home from his South African tour, has consented to launch the Canadian Pacific new giant express Atlantic liner EMPRESS OF BRITAIN at Glasgow on June 11. The vessel is being built by John Brown & Co. Ltd., Clydebank, the order having been placed by the Canadian Pacific railway toward the end of 1927. When she is put into commission next year she will be one of the world's largest vessels and the most up-to-date expression of Britain's shipbuilding industry. At the same time she is the largest steamer yet built for the Canadian service. She is 755 feet long, 97½ feet broad and 42,000 tons gross.

* * *

A UNIQUE ship reconstruction and re-fitment job costing over £100,000 has been carried out at Palmers yard, Hebburn-on-Tyne. The ship is the Anglo-American Oil Co.'s 12,000-ton CADILLAC, one of the largest tankers afloat which instead of being laid up for repairs which would have taken at least four months, has been cut clean in three and a new midships section, built while the vessel was still in commission at sea, has been inserted between the original bow and stern sections, the whole operation being estimated to take about seven weeks. The operation of cutting the vessel in three took only a fortnight. The new mid portion is over 300 feet long.

Welded Steel Gear Case on Dredge New Jersey



A 1400 boiler horsepower geared turbine drive, in which the first all welded steel gear case was used, has been installed on the American Dredging Co.'s dredge NEW JERSEY by the Westinghouse Electric & Mfg. Co. Because the all-welded construction provides a lighter and stronger gear case, it has become standard practice for dredge installations. The first all-welded gear case as installed on the NEW JERSEY is shown in the accompanying illustration.

Steamship Merger Off

The definite termination of negotiations seeking a merger of American-Hawaiian Steamship Co. and Dollar Steamship Co. Ltd., two of the largest shipping companies under the American flag, was announced on May 6 by President Roger L. Lapham of American-Hawaiian in the following statement:

"Certain directors of the two companies have, as individuals, endeavored to find a basis of consolidation which they could recommend to their respective stockholders for acceptance. Not having been able to agree on any plan satisfactory to both interests, negotiations have been definitely discontinued."

The Dollar company operates five freighters and 19 combination passenger and freight vessels in the trans-Pacific and round-the-world trades.

Organize New Company

The Isthmian Steamship Co., a Delaware corporation, controlled by the United States Steel Corp., has been organized and has acquired and will operate the ocean going fleet of cargo steamers heretofore owned and operated by the United States Steel Products Co. under the trade name of the Isthmian Steamship Lines in transporting the company's products.

Ocean Freight Rates

Per 100 Pounds Unless Otherwise Stated

Quotations Corrected to May 18, 1930 on Future Loadings

NOTE: FREIGHT RATES STEADY WITH SLIGHT CHANGE

New York to	Grain	Provisions	Cotton (H. D.)	Flour	General cargo cu. ft.	General cargo 180 lbs.	††Finished steel Freight	REMARKS Offered
Liverpool	1s 6d	$0.65	0.45	0.18	$0.50	$0.90	$8.00T***	Fair
London	1s 6d	0.65	0.45	0.18	0.50	0.90	8.00T***	Fair
Oslo	$0.11	0.45	0.50	0.30	0.42½	0.85	8.00T	Poor
Copenhagen	0.11	0.45	0.50	0.30	0.45	0.90	8.00T	Poor
xHamburg	0.08	0.32½	0.45	0.18	0.50	0.90	10.00T	Poor
xBremen	0.07	0.45	0.45	0.18	0.50	0.90	10.00T	Fair
Rotterdam and Amsterdam	0.09	0.32½	0.45	0.18	0.45	0.80	9.50T	Fair
Antwerp	0.09	.....	0.45	0.18	0.45	0.80	9.50T	Poor
Havre	0.10	0.37½	0.31	0.30	0.45	0.80	9.00T	Good
Bordeaux	0.10	0.37½	0.31	0.30	0.45	0.80	9.00T	Good
Barcelona	....	0.50	0.30	10.00 bags	—12.00T—		12.00T	Fair
Lisbon	....	0.65	0.45	8.00T bags	—23.00T—		8.00T	Fair
Marseilles	....	0.65	0.40	7.00 bags	—23.00T—		8.00T	Fair
Genoa	0.12	14.25T	0.50	9.00	—23.00T—		11.50T	Fair
Naples	0.12	14.25T	0.50	9.00	—23.00T—		11.50T	Fair
Constantinople	0.27	20.00T	0.75	0.40½	—24.00T—		11.50T	Fair
Alexandria	....	20.00T	0.75	0.40½	—24.00T—		11.50T	Fair
Algiers	....	0.75	0.60	8.0T bags	—23.00T—		11.50T	Fair
***Dakar	....	20.40	....	18.60T	—27.60T—		13.80T	Fair
Capetown	....	18.00	....	13.00 per 2240 lbs.	20.00		20.00	Fair
Buenos Aires	....	22.00T	....	....	20 to 22.00T†		8.00 to 8.80T	Fair
**Rio de Janeiro	....	22.00T	....	....	30 to 22.00T†		7.00 to 7.70T†	Fair
Pernambuco	....	22.00T	....	9.00T	—22.00T—†		9.70T†	Fair
Havana	0.30*	0.50	....	0.30*	0.61	1.33	10.00	Fair
Vera Cruz	0.35	0.40	0.50	0.35	x		0.25 to 0.35	Fair
Valparaiso	....	1.07	....	0.70	....	....	10.00T	Fair
San Francisco	....	0.45 to 0.90	....	0.40 to 1.10	....	....	0.25 to 0.30	Very good
*Sydney	....	20.00	1.25	15.00	17.50 to 25.00		9.00 and 12.00	Poor
(x)Calcutta	....	....	0.60	to Bombay not Calcutta	—20.00T—		10.00T	Fair

T—Ton. ‡Per quarter of 480 lbs. †Landed. ‡‡Heavy products limited in length. *Extra charge for wharfage.
**Plus $0.50 surcharge on all rates to Rio de Janeiro on account of congestion. ***Plus 15 per cent.
xNo general cargo rates to Vera Cruz.
*Flour to Sydney—$22.50. General cargo—$17.50 to $27.50. Finished steel—$9.50 and $12.50.
***Rates, effective at once, to Dakar, will be based on whether the company makes a contract. Rates without a contract will be about 20 per cent higher. With a contract the same rates as last month apply.
(x)General cargo to Calcutta is $18 up to June 30. After June 30 it will be $20.

From North Pacific Ports to	Lumber Per m. t.
San Francisco	$4.00 to 4.25
South California	4.00 to 4.50
Hawaiian Islands	9.00 to 10.00
New Zealand	16.00 to 18.00
Sydney	9.00 to 11.00
Melbourne-Adelaide	10.00 to 12.00
Peru-Chile	13.00 to 14.00
South Africa	15.00 to 17.00
Cuba	12.00 to 14.00
United Kingdom	47s 6d to 60s
Baltimore-Boston range	$11.00 to 12.00
Florida Range	15.00 to 16.00
Buenos Aires	16.00 to 20.00
South America — East Coast	13.00 to 14.00
South America — West Coast	13.00 to 14.00
China	6.25 to 6.50
Japan	5.50 to 7.00
Japan (logs)	7.00 to 9.00
Flour and Wheat	
U. K. and Continent (gross tons)	17s 6d to 21s
Oriental Ports (net tons)	$2.75 to 4.00

NOTE: Lighterage rates on fuel in New York reduced from 6½ to 5½c per barrel. The coal strike in Britain is now settled and freight rates or bunker prices for coal or pig iron are again quoted.

General cargo rates to Havana change daily and are omitted for the time being.

Rates to Calcutta are subject to change without notice. Cotton goes only to Bombay. Landing charge of $2.00 per freight ton at Valparaiso.

Principal Rates To and From United Kingdom

	s	d
Grain, River Plate to United Kingdom	14	0
Coal, South Wales to Near East	7	9
Coal, United Kingdom to Buenos Aires	13	6
Manganese Ore, Poti to Philadelphia	$3.75	
Pig iron, United Kingdom to New York or Philadelphia	12	6
Iron ore, Bilbao to Cardiff	5	3
Iron ore, Huelva to Phila. or Balto	10	9

Bunker Prices

At New York

	Coal alongside per ton	Fuel oil alongside per barrel	Diesel engine oil alongside per gallon
July 18, 1929	4.75@5.25	1.10	4.92
Aug. 18	4.75	1.10	4.92
Sept. 18	5.00@5.25	1.10	4.92
Oct. 18	5.00@5.25	1.10	4.92
Nov. 18	5.00@5.25	1.10	4.92
Dec. 18	5.00@5.25	1.10	4.92
Jan. 18	5.00@5.25	1.10	4.92
Feb. 18	5.00@5.25	1.10	4.92
Mar. 18	5.00@5.25	1.10	4.92
April 18	5.00@5.25	1.20	4.92
May 18, 1930	5.00@5.25	1.15	4.76

At Philadelphia

	Coal trim. in bunk per ton	Fuel oil alongside per barrel	Diesel Eng. oil alongside per gallon
July 18, 1929	4.90@5.25	1.10	4.88
Aug. 18	4.90@5.25	1.10	4.88
Sept 18	4.90@5.25	1.10	4.88
Oct. 18	4.90@5.25	1.10	4.88
Nov. 18	4.90@5.25	1.10	4.88
Dec. 18	4.90@5.25	1.10	4.88
Jan. 18	4.90@5.25	1.10	4.88
Feb. 18	5.00@5.25	1.10	4.88
Mar. 18	5.00@5.25	1.10	4.88
April 18	5.00@5.25	1.20	4.88
May 18, 1930	5.00@5.25	1.20	4.88

Other Ports

Boston, coal, per ton	$6.86
Boston, oil, f. a. s., per barrel	1.16
Hampton Roads, coal, per ton, f.o.b., piers	$4.50 to 4.75
April 18—Cardiff, coal, per ton	13s 6d
London, coal, per ton	—s —d
Antwerp, coal, per ton	20s 6d
Antwerp, Fuel oil, per ton	67s6d
Antwerp, Diesel oil, per ton	82s 6d
British ports, Fuel oil	67s 6d
British ports, Diesel oil	82s 6d

Up and Down the Great Lakes

Illinois Waterway Project—Ore and Coal Shipments Off—Lake Levels—New Ore Docks Opened—New Arrangement of Lights

BACKERS of the Illinois waterway project as a link in the Lakes-to-Gulf shipping channel are waging a spirited fight against the proposal to limit further the flow of water from Lake Michigan, which has been suggested in the pending rivers and harbors bill before congress.

The lake senators, led by Senator Vandenberg, of Michigan, have expressed the demand that the diversion for the proposed waterway shall not be more than the 1500 cubic feet per second authorized under the recent decision of the United States Supreme Court. Federal appropriations for the $7,500,000 Illinois waterway, which has been voted by the house of representatives, suggests maintenance and operation of the 9-foot channel "with the smallest amount of diversion possible."

Attorney General Oscar Carlstrom, of Illinois, takes the point that only experience will show how much water is required for the operation of this waterway system, particularly the locks and dams built by Illinois without federal aid. "Our right to obtain more water if needed should not be foreclosed," he stated. "The state of Illinois does not desire to divert one drop more water than is needed, but it cannot consent to a limitation to be placed upon an agency of the federal government, the equity of which cannot now be determined."

Ore and Coal Shipments

During the month of April considerably less tonnage of iron ore and coal was moved on the Great Lakes than for the same period in 1929. During that month only 9953 tons of iron ore were received at Lake Erie docks from upper lake ports as compared with 1,190,925 tons for the same month during 1929, according to a report of the Lake Superior Iron Ore association. For the same period 1,881,262 tons of coal were dumped into lake freighters as compared with 2,831,532 tons for 1929.

Shipments of ore have not moved from Lake Erie docks as rapidly this season as they did last and judging from indications the movement of ore this season will not be as large as last year's unless there is a very definite increase in the demands of the steel producing centers.

In regard to the grain trade there is very little demand for large boats and it is believed that there will be no definite change in the grain situation until further demands are made in foreign grain buying markets.

April Lake Levels

The United States Lake survey reports the monthly mean stages of the Great Lakes for the month of April as follows:

Lakes	Feet above mean sea level
Superior	601.97
Michigan-Huron	580.82
St. Clair	576.30
Erie	573.96
Ontario	247.99

Lake Superior was 0.13-foot lower than in March and it was 0.60 foot lower than the April stage of a year ago. Lakes Michigan-Huron were 0.12 foot higher than in March and they were 0.58 foot lower than the April stage of a year ago. Lake Erie was 0.37 foot higher than in March and it was 0.35 foot higher than the April stage of a year ago, 2.03 feet above the average stage of April of the last ten years. Lake Ontario was 0.33 foot higher than in March and it was 0.71 foot higher than the April stage of a year ago, 2.10 feet above the average stage of April of the last ten years.

New Arrangement of Lights

A new method of erecting double range lights, applicable to narrow channels where traffic is extremely heavy, has just been devised, according to the lighthouse service, of the department of commerce. This adaptation of range lights is a part of the important work of widening the channels of the St. Mary's river, east of Neebish Island, between Lakes Superior and Huron, where the volume of commerce is so great as to demand the fullest protection. The dredging operations under the direction of the United States engineers, have been going on for over two years, and have necessitated many changes in the lighthouses and other aids to navigation maintained by the lighthouse service.

The new range lights which are just now being rebuilt, at an estimated cost of $20,000, are the Dark Hole range lights and the Harwood Point range lights, located in the state of Michigan. When the new construction is completed, there will be eight lights, four at each end of the channel. Previous installations in the United States have never consisted of more than four lights.

Vessels traveling the narrow channels at the St. Mary's river had previously been guided, in a number of instances, by range lights at one end of a single straight section. By keeping the two range lights in line, one behind the other, a vessel remained safely within the channel confines. Because of the narrowness of the original channel, however, vessels passed each other at very close quarters, and were liable to damage by collision in bad weather.

The new range lights, now being built, which it is hoped will be ready for service during the present season, have the added advantage of indicating parallel up and down bound courses upon which vessels can navigate without interfering with each other.

New Ore Docks Now Open

The new Chesapeake & Ohio ore docks at the mouth of the Maumee River, Toledo, O., were scheduled to begin operation Friday, May 23. These docks, which are the most up to date on the Great Lakes, are equipped with three Wellman stiff-leg all electric unloaders which will permit unloading directly to cars or stock pile. The loaders are designed to take ore from ore carrying boats with beams up to 65 feet. The new docks are located practically three miles nearer the lake than the company's old docks on the Maumee river. With operation of the new dock equipment, lake freighters will be able to dock and depart without the aid of tugs. In addition, six miles of river movement with the attendant hazards, drawbridges and low water will be eliminated.

The new Canadian Pacific liner EMPRESS OF JAPAN attained a speed of 23 knots on her trials off Scotland on May 14, exceeding by two knots the speed predicted by her builders.

Joseph F. Hayes Dies at Age of 72

TIME is slowly but surely taking its toll of the iron men of the Great Lakes. Joseph F. Hayes, born in Detroit 1858, and first fleet engineer of the United States Steel Corp.'s great inland fleet of ore carriers, died in Lakewood, O. on April 20. His connection with lake shipping goes back to the eighties and nineties. He early showed his special aptitude as a marine engineer and he had already attained the rank of chief engineer on Great Lakes steamers during that period.

Before the Steel corporation was thought of, Hayes had been made superintending engineer of the lake vessels of the American Steel & Wire Co. by A. B. Wolvin, president of that company and perhaps one of the most outstanding shipping men of his time on the Great Lakes. Hayes was also superintending engineer under the same management of the Peavey Steamship Co. and the Chicago & St. Lawrence Transportation Co. with a fleet of ten canal size steamers.



JOSEPH F. HAYES

In the meantime the Carnegie Steel Co. in 1900 bought and built a number of lake vessels and organized the Pittsburgh Steamship Co. The fleet engineer of this company was F. B. Smith. On April 1, 1901 the United States Steel Corp. took over and added to the Pittsburgh Steamship Co. as one of its subsidiaries. A. B. Wolvin became president and, knowing his man, appointed Hayes as fleet engineer of a greatly enlarged Pittsburgh Steamship Co. He served in this position for about three years until Jan. 1, 1904, or as long as his chief A. B. Wolvin remained in office. During this period F. B. Smith served with Hayes as assistant fleet engineer. There was a fine accord between the two men and a close friendship existed until the end. When Hayes retired with his chief from Steel corporation activities, F. B. Smith was appointed fleet engineer under Harry Coulby as president. The main offices of the company during the tenure of Hayes was at Duluth, Minn. and he spent perhaps half of his time there. He continued as fleet engineer for the vessel interests managed by Wolvin. And later went into business under the firm name of Thompson Hayes Co. handling boiler compounds and engineering supplies.

In 1918 the great war shipbuilding program on the lakes was in charge of Henry Penton, assisted by Capt. R. W. England. One of the particularly troublesome features that the district manager had to face was the difficulties attending turning over the newly built vessels to the operating division representatives at Montreal. There were inumerable complaints of one kind or another and Henry Penton told Captain England that he needed a strong man, a man who knew his business and one who could neither be hoodwinked nor scared, to go to Montreal to take care of the delivery and entry into service of the vessels being built for ocean use on the Great Lakes. Though, as the story goes, there had existed for years a violent personal antipathy between Hayes and Penton, when the former was suggested for this position by Captain England, Penton allowed that he was the very man for the job, which shows, with one objective in mind during the war, how personal differences were forgotten among men of character and intelligence.

Hayes served with notable efficiency in charge of sea trials for the new ships turned out. With his long practical experience and personal qualifications of leadership, he carried on this work with great success. After the war period he supervised the conversion of the poker fleet the ACE, KING, QUEEN and JACK, to refrigerator and package ships for the McDougall interests, under Henry Penton. This work was done at the Staten Island Shipbuilding Co. in New York and was the last active work he carried out. His old colleague, F. B. Smith paid him perhaps the best tribute from one engineer to another in saying that Joe Hayes was the best grade of chief engineer.

Polytechnic Institute of Brooklyn will celebrate the completion of its 75th year on June 17 and 18.

Mail Routes Certified

In compliance with the requirements of section 403 of the merchant marine act, the shipping board on May 21 certified to the postmaster general the following essentials for a proposed ocean mail route from San Francisco by Manila to Singapore.

Not less than 10 sailings a year with combination cargo and passenger vessels of not less than 10,000 gross tons, capable of maintaining a speed of not less than 13 knots in ordinary weather at sea.

Branch Offices of Salvage Association

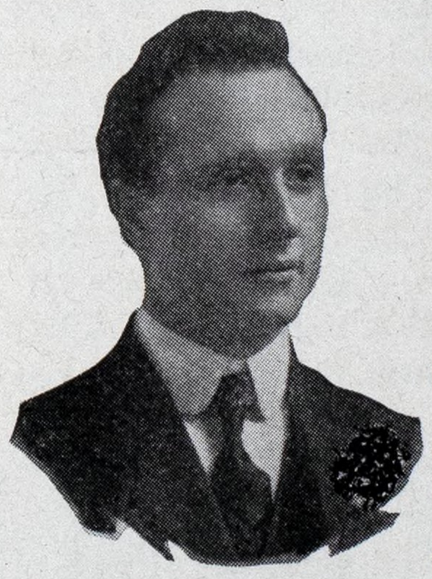
CAPT. R. D. GATEWOOD, general manager of the United States Salvage association, is at present in Europe making a tour of the association's agencies in London, Hamburg, Antwerp and other points.

A branch office of the association has been opened at 1038 Marine Trust building, Buffalo, and William T. Smith has been appointed resident surveyor. Previous to joining the association, Mr. Smith was for 14 years assistant United States steamboat inspector at Buffalo, and prior to that time had served for 10 years on various vessels of the Cleveland-Cliffs Iron Co. on the Great Lakes, nine years as chief engineer and one year as first assistant engineer. Before joining the Cleveland-Cliffs fleet, Mr. Smith was employed by the Wheeler Marine Engine Works at Bay City, Mich., on general ship construction.



W. G. ATHERHOLT

W. G. Atherholt, who for the past 10 years has been a surveyor for the salvage association at New York, has been appointed resident surveyor at Cleveland. From 1917 to 1920 Mr. Atherholt acted as resident inspector for the United States shipping board at Toledo on the construction of 30 steel ships and from 1906 to 1916 he served as assistant superintendent for the Toledo Shipbuilding Co. His earlier experience included that of inspector of construction for the Standard Oil Co. at the Cramp shipyard and at Trigg Island, Richmond, Va.

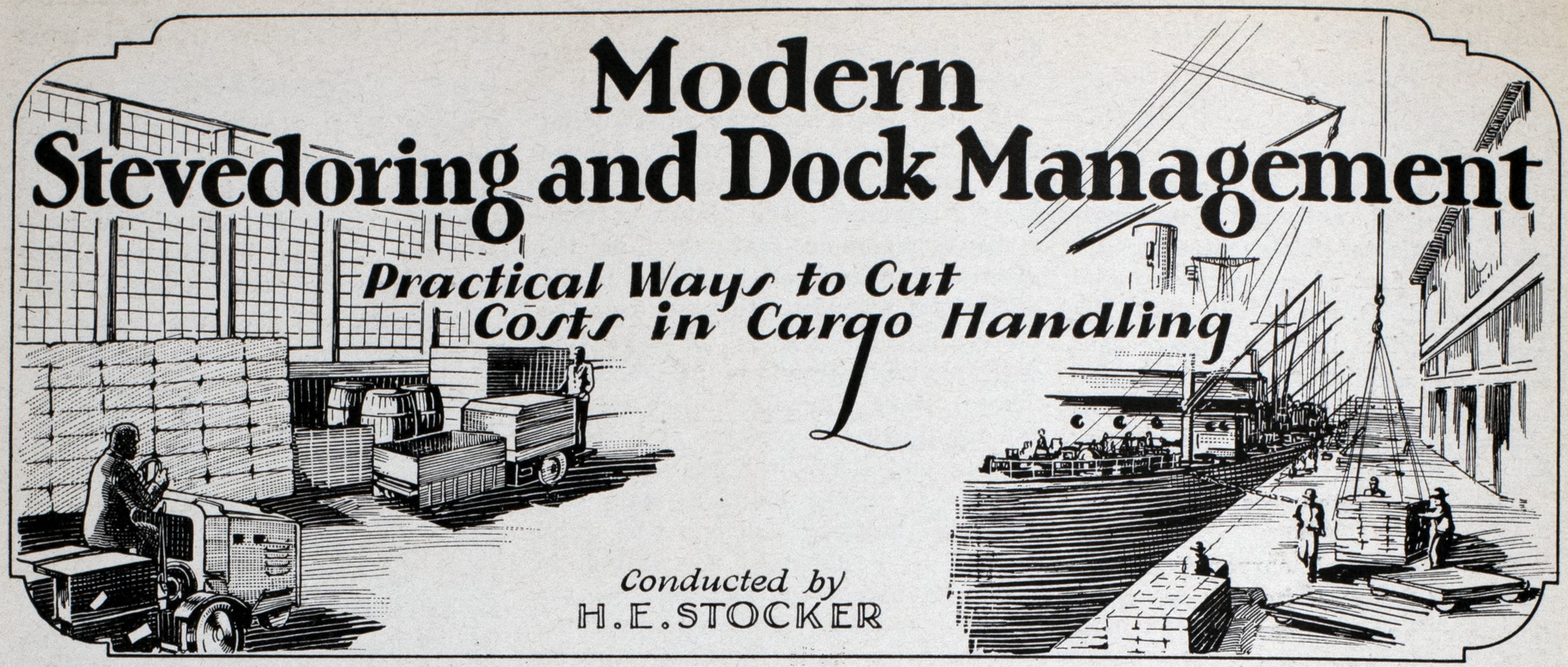


WM. T. SMITH

The Cleveland office of the United States Salvage association is located at 804-6 Rockefeller building and is in charge of Guy A. Myers, principal surveyor for the Great Lakes district.

* * *

E. A. Doyle, consulting engineer of the Linde Air Products Co., was elected president of the American Welding society April 25.



Modern Stevedoring and Dock Management

Practical Ways to Cut Costs in Cargo Handling

Conducted by
H. E. STOCKER

My Conditions Are Different

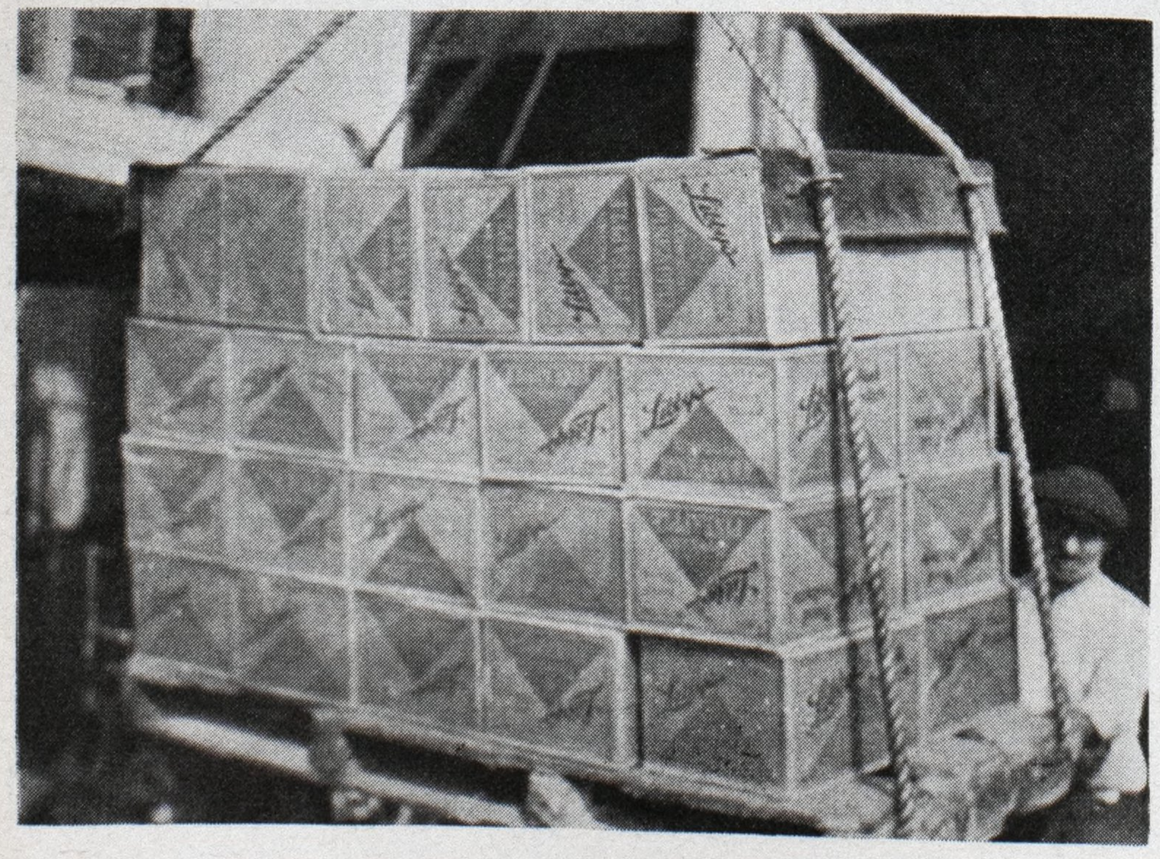
But Principles Are the Same—Study and Adapt Modern Methods to Your Problems

By H. E. Stocker

MY CONDITIONS are different. How many times we have heard this urged as the reason for not studying operations at other terminals and for not adopting methods and equipment that reduce costs and improve service!

When one shuts his mind to facts concerning the accomplishments of others it is of course inexcusable. If "My conditions are different" is only an excuse for not improving the operation of a terminal, it is to be condemned. If this reason is given and is actually in accord with the facts, it is unquestionably the correct position to take. However, experience indicates that altogether too often no serious attempt is made to get the facts of the experiences of others and in other cases the effort to get the facts is not organized and the results are therefore incomplete and inaccurate.

There may be no direct comparison between the costs and tons per hatch hour at one terminal and at other terminals. Piers, ships, class of cargo and labor conditions may all be "different." However, a direct comparison can be made between many of the methods and much of the equipment used. For example, let us take two terminals with which I am familiar. The one terminal is entirely different from the other terminal. Also the ships are different, the class of cargo different, and the labor conditions are different. One of the terminals operated formerly at .85 tons per man hour as compared with 1.72 at the other terminal. Finally the first terminal adopted the same basic methods and equipment used by the other terminal and thereby increased its tons per man hour to 1.21. The only other change made was improving the floor in the gangways by bolting down steel sheets. A willingness to be shown resulted in a 17 per cent decrease in cargo handling costs with conditions quite different.



Top Tier of Cases of Canned Goods Placed on Edge—This Prevents Damage to the Cans

Improvement in Details Possible

The methods and equipment in use on these terminals have been discussed frequently in MARINE REVIEW; reduction of handling by receiving to and delivering from trailers and using gasoline or electric tractors to haul trailer trains.

Where a complete plan of operation cannot be adopted, details can often be utilized to advantage. Such a simple detail as the bearings of trucks is not affected by the kind of terminal, ships, cargo and the labor conditions that are encountered. Any terminal using any kind of a truck or trailer can have them equipped with roller or ball bearings and thereby reduce the effort necessary to move a loaded truck 40 to 50 per cent. This has been proved in engineering tests.

An intercoastal stevedore at Baltimore adopted the plan of slinging

trailers overside from a coastwise line that had been using this method successfuly The result was an important increase in the tons per hatch hour. This was because the falls were more quickly attached at shipside and when conditions in the ship permit, the slingload is more quickly moved in the ship. If an airplane or platform swing is used, the load must be steadied and directed so that it lands properly on a four wheel truck. When the trailer is slung overside, time is saved because the wheels are "on the draft" and the load can be dropped quickly.

Trailers equipped with automatic couplers is another detail that is used to advantage on railroad terminals as well as on steamship terminals and in many warehouses and industrial plants.

One intercoastal line reduced damage to canned goods by piling the top tier in a slingload on edge so that the pressure of the spreaders was against the cans lengthwise, the direction of greatest resistance to crushing. Is there anything about this method which prevents its adoption by any line handling canned goods over-all, regardless how different its condition may be?

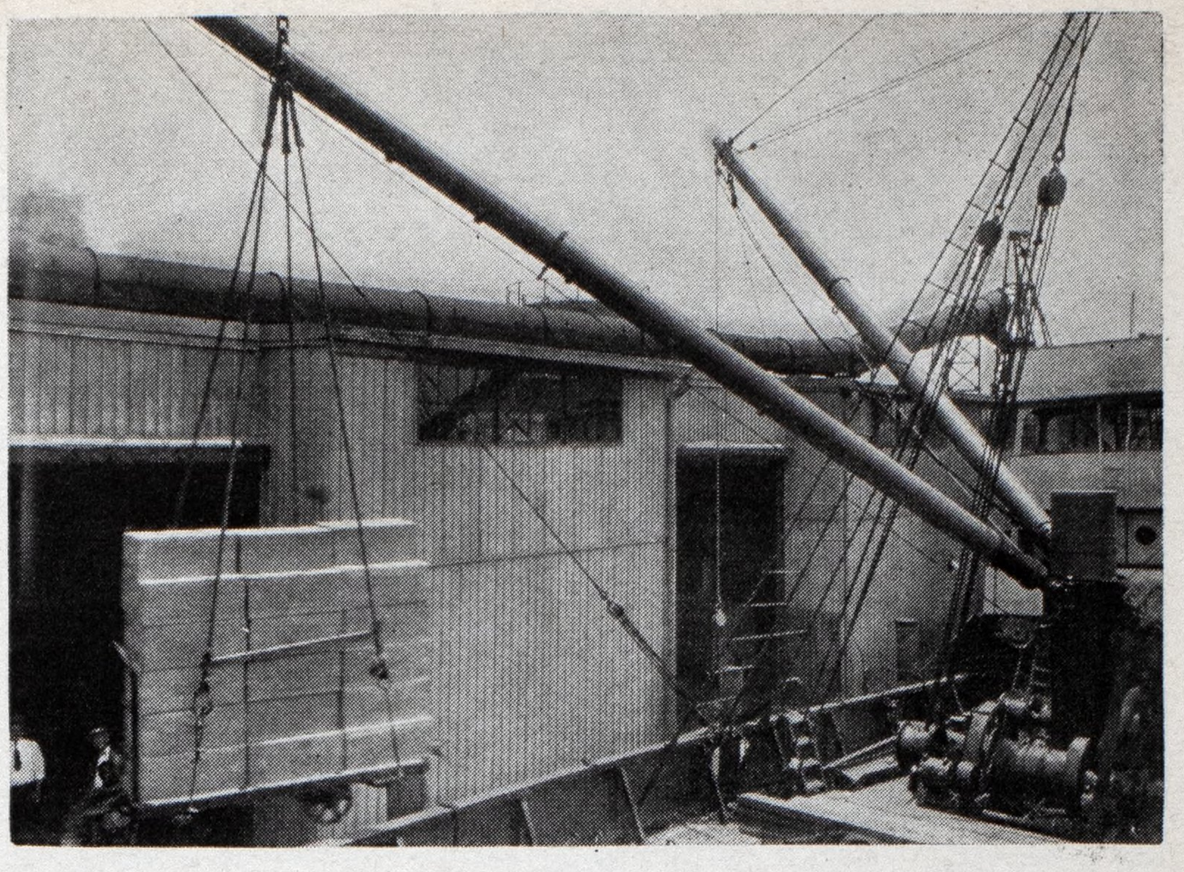
Fitting the Tool to Service

The "pie plate" sling used by the American-Hawaiian line is an advance over the old fashioned net sling and may be used on many piers where conditions are "different." If reels of barbed wire are being loaded it is far better to use a "pie plate" sling. First it avoids rehandling at ship's side. The reels are picked up at the pile and are placed on the pie plate sling which rests on a four wheel truck or trailer. When the load is complete, the net is folded over the load and then the truck is hauled by a gasoline tractor or by hand to the tackle. The tackle is attached quickly to the load and the load is hoisted overside. The sling load may be landed on another truck in the ship when conditions permit, otherwise the pie plate may be landed and the reels taken from the square of the hatch to stowage. Time is saved because when the old fashioned net sling is emptied by dumping, the barbes of the wire catch the net and must be unentangled before the net can be returned to the pier. The "pie plate" sling is also used to advantage in handling small rolls of paper and cases, or barrels and drums that are damaged by the net sling pulling one against the other.

Difference in conditions was not responsible for the fact that a gang was handling pigs of lead from the dock floor to shipside, placing them in a net sling and dumping them out of the net sling into stowage. This cargo could be received on a four-wheel truck and kept there until ready to go into the ship. All conditions on the terminal allowed this to be done. When the ship is ready to load, the truck can be pulled alongside and hoisted overside, and then for the first time the stevedores would handle the pigs.

Recently I saw longshoremen struggling with a four-wheel truck on a bad floor at an intercoastal terminal. Great effort was required to move this truck, loaded with a small swingload, because of the poor condition of the floor in the gangway down the center of the pier. A few miles away, another line operating under entirely different conditions, had solved this problem many months before by using steel sheets on their floor, thereby changing a very bad floor to a very good floor. A floor is a floor and although conditions may be different, floors can always be made good.

Mixed marks are often offered as a reason for not using mechanical equipment, yet a study of various operations shows that this condition does permit the use of mechanical equipment. At Pinner's Point, Va., cargo coming out of Chesapeake bay steamers, is sorted to trailers at a central platform. The loaded trailers are hauled to outgoing cars by electric tractors.



Slinging Trailers Over Side—Eastern Steamship Co. — At Richmond, Va.

On Handling Mixed Marks

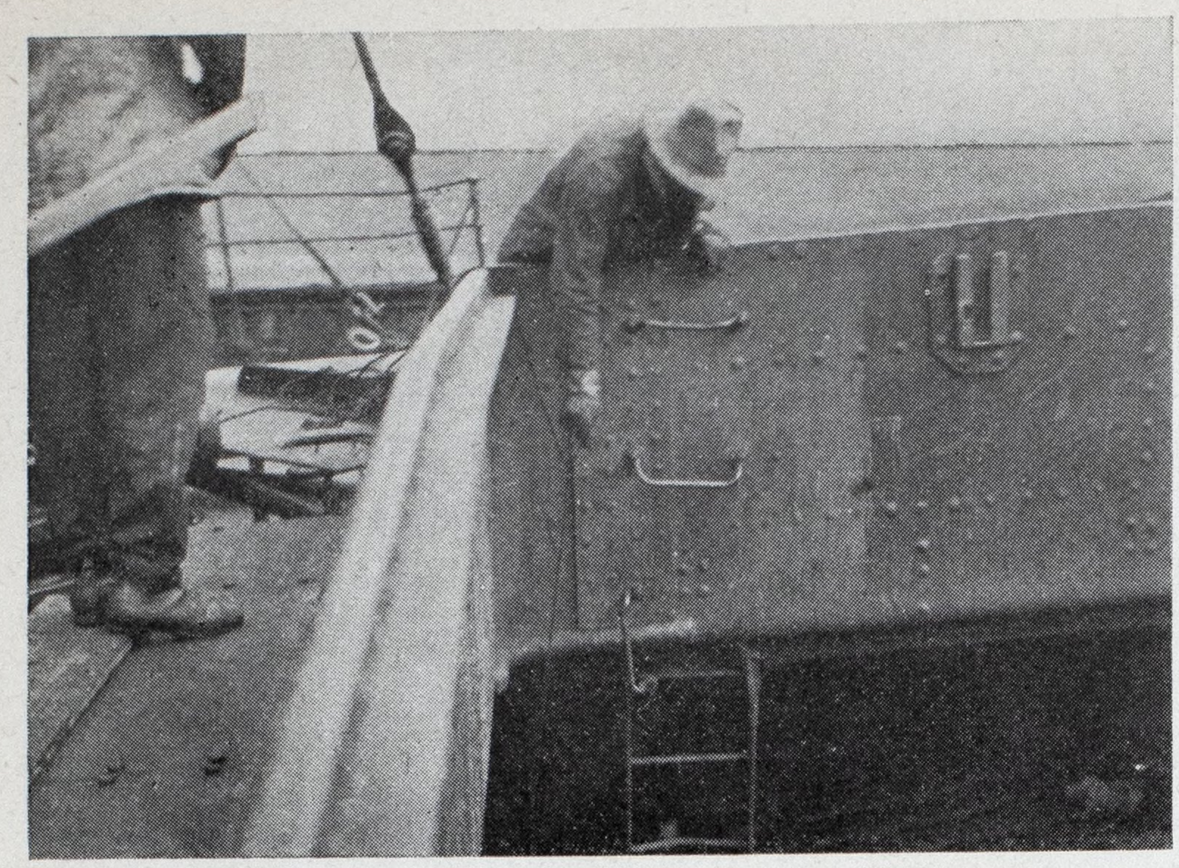
The Eastern Steamship Co. solved the problem of mixed marks at its terminal in Richmond, Va., by another method. The cargo is taken out of the ship on trailers which are unloaded on to skids, each skid being designated for a certain delivery. The loaded skids are taken to delivery platform by hand lift trucks.

Another line takes the cargo out of the ship on conveyors and rough piles it. Later the marks are separated with hand trucks. The ship's dispatch was improved 50 per cent at the same cost per ton as compared with the former method of separating marks as the cargo was discharged. In this case ship's dispatch was more important than cost of handling.

Poor supervision is not the result of terminal conditions. Different conditions do not excuse poor supervision. Difficult labor conditions that



Pie Plate Sling Handling Rolls of Paper



A Broken Ladder — Conditions Such as This Are Inexcusable

increase cargo handling costs above a proper figure have been largely corrected on many terminals by the supervisory members of the organization. The most important principle applied is that all men are human, and must be treated accordingly.

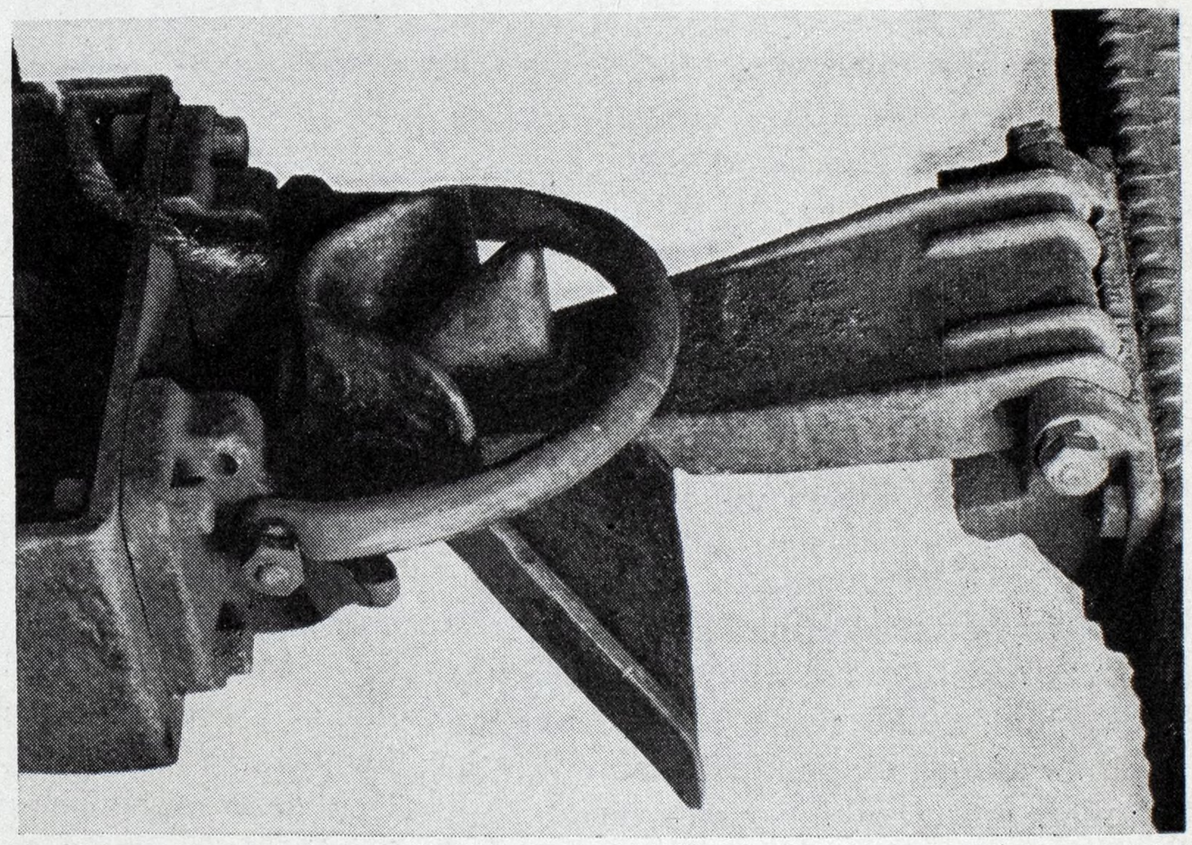
One line at Baltimore increased tons per hatch per hour 75 per cent by improved supervision alone. One of the most important factors was the change in the selection of the men in the gangs.

Making Hatches Ready Quickly

The great amount of handling caused by the numerous hatch covers and the heavy strongbacks which must be moved frequently in loading and discharging is usually accepted without complaint. This is a wasteful operation and one that investigation shows can be improved. The most recent development in this regard is the T and D method of handling strongbacks which was adopted in the new Prince line ships for the South American trade. The strongbacks are fitted at the ends with rollers which roll along a track fitted near the upper edge of the coamings on the upper deck hatches. On the 'tween-deck hatches the deck plating itself, boarded by the usual bulb coaming set back, forms the necessary track for the rollers. When the hatch is uncovered the strongbacks are simply transferred to one end of the hatch, where they are accommodated in a recess provided. This recess is so arranged that the strongbacks are clear of the hatch opening proper. The saving in stevedoring costs and ship's time repays within a short time the very moderate outlay necessary to equip hatches in this manner.

The elementary principles of safe operation can be applied any place whether it be a terminal handling big transatlantic liners or a Chesapeake bay terminal handling small side port ships. Cluttered up decks, broken hatch covers, weakened falls and elevator hoists, throwing dunnage into holds, all these increase insurance premiums above a reasonable amount. It has been proved that excessive insurance costs can be reduced in any industry by proper supervision.

One characteristic of many well managed shore industries is a wage incentive plan. Some state that these plans cannot be adopted in pier work. They cannot be adopted in their entirety but unquestionably a wage incentive plan can be adapted to certain operations. The article entitled "Where Mechanical Equipment Cuts Costs," in the May issue of MARINE REVIEW, describes the working of a bonus plan in connection with electric trucks.



Tractor and Trailer Equipped with Automatic Coupler

Why Not Learn from Others?

Often the trouble is not that conditions are different but that the man in charge of a terminal is not sufficiently acquainted with what other terminals are doing, due to pressure of current duties and fault of management in the way of not providing the proper incentives for putting forth the best efforts.

"My conditions are different" is only worthy of consideration when in accord with the facts. The facts are that differences in conditions do not excuse a failure to learn from the experiences of others.

One of the chief characteristics of modern American management is a realization that no one has a monopoly on brain power and experience. Modern American management believes that we can all profit from each others experience and that a test of the efficiency of management is a willingness to profit from the experience of others.

A New Type of Merchandising Terminal

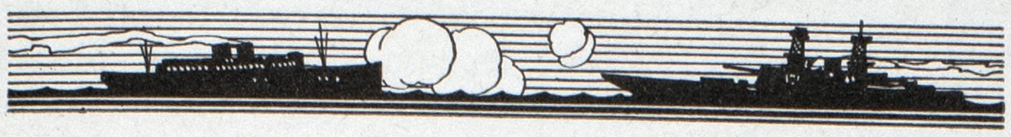
THE Canada Steamship lines opened its new general merchandise terminal at Hamilton, Ont., with the opening of navigation on the lakes. The layout of this terminal is of particular interest. The shed is in the form of a U, with a covered driveway between the two sides. The shed area available for storage and trucking of cargo totals 82,625 square feet, exclusive of the space in the driveway. Space is available for future expansion of the floor area to 202,000 square feet.

The shed is 488 feet and 6 inches long and 80 feet wide on the east side and 73 feet 8 inches wide on the west side, measured to the inner points on the saw toothed loading and unloading platform along the driveway.

The shed is of steel truss construction with trusses having a clear span

(*Continued on Page* 66)

Useful Hints on Cargo Handling





TEN to fifteen minutes can be saved each time a shift is made from offshore to inshore or vice versa if a third boom is fitted at the main hatches. The change over is facilitated by anticipating the shift, getting the unused boom ready to work and sending the men to the other side of the ship as the work on the one side is completed. The third boom is soon paid for from the savings in time resulting.

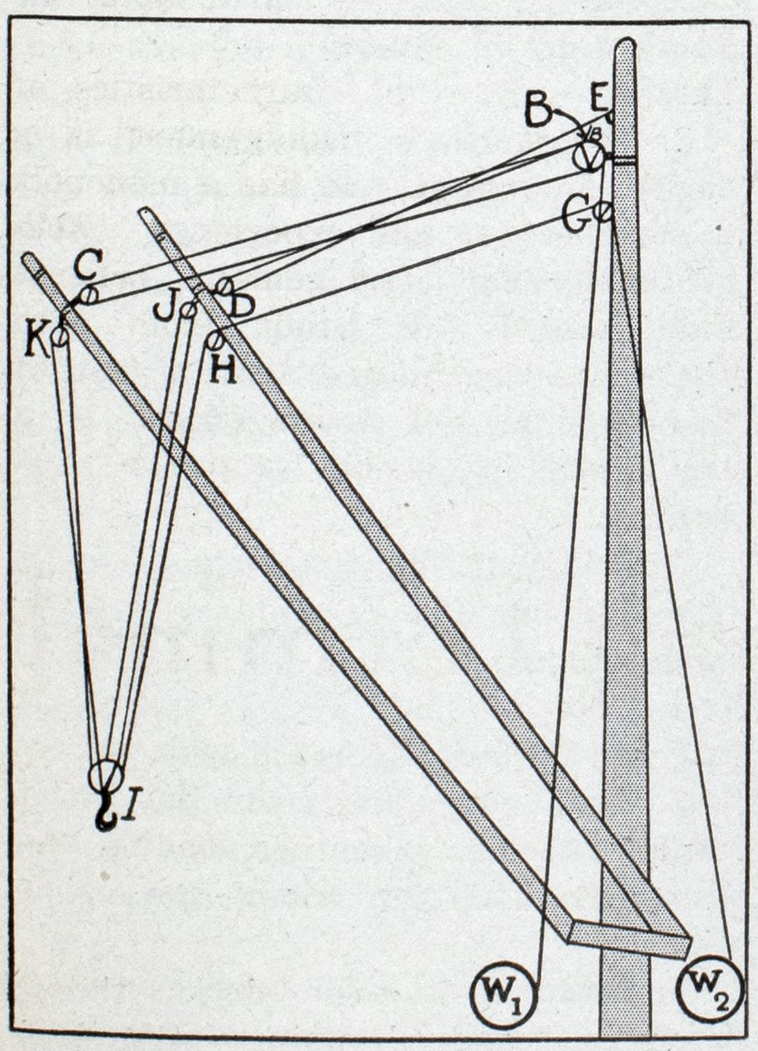
Rig Two Five-Ton Booms To Handle Heavy Lifts

THIS rigging is used to handle pieces up to as much as 13 tons in hatches where there is no heavy lift boom or if the heavy lift boom is out of order. As shown in the diagram, two five-ton booms are swung together with falls and block arrangement as indicated.

Referring to the diagram, the goosenecks at L of each boom must not be more than two feet apart. The winches are indicated by W_1 and W_2. The wire line leading from winch W_1 goes up into the double block B; from B to single block C; from C to B again, from B to single block D; and from D to be secured at cleat E.

The wire line F, leading from winch W_2 goes up into the single block G; from G to single block H; from H to double block I; from I to single block J; from J to I; from I to single block K; from K back to I to be secured to the becket on the double block I.

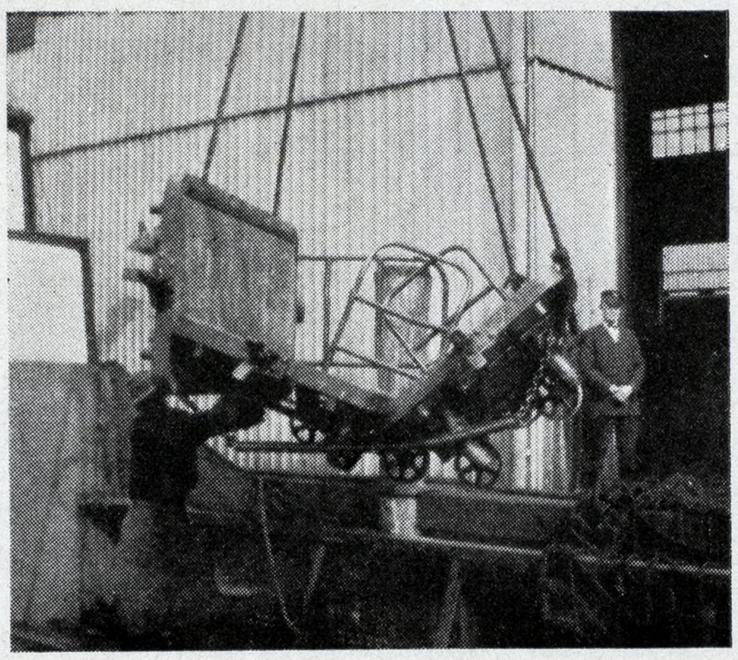
A piece of 8 by 8 inch or 6 by 6-inch timber is attached to either boom to prevent them from coming together and damaging cleats and blocks which might be caused by the yawing of the moving booms. When the boom has lifted the load from the dock to the hatch level, the boom guys cannot be used, so it is necessary to rig a snatch block on the side of the ship and to run a wire line from the winch to the load, thus drawing it over the hatch.



HOW TWO 5-TON BOOMS ARE RIGGED FOR HEAVY LIFT

THIS page is to be devoted to short items on all matters having to do with the more efficient turn-around of ships. These items are intended to be of a helpful nature.

We will welcome for this page brief descriptions, illustrated if possible, of any better or safer way of performing any function in cargo handling. Also, any questions submitted will be answered by the editor.



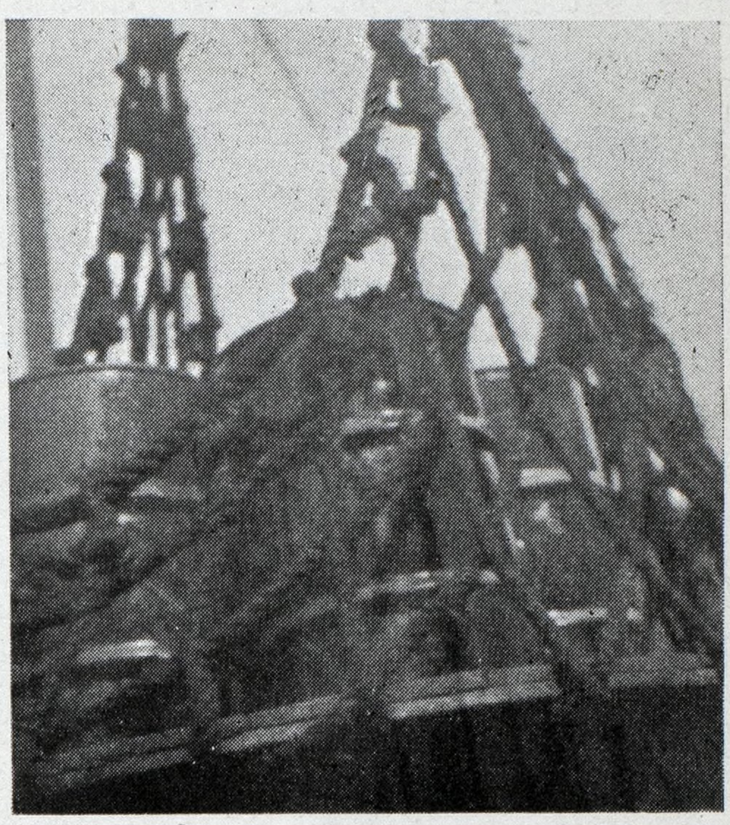
SLINGING OUT EMPTY TRAILERS THREE AT A TIME

How Cost is Reduced

SLINGING empty trailers from the hold three at a time improved the tons per hour record at the Richmond terminal of the Eastern Steamship Co. as compared with the former method of slinging an empty trailer each time the falls were returned to the dock.

Roller bearings, it has been demonstrated, cuts the power necessary to move trucks from 40 to 50 per cent. This means that larger loads at faster speed can be moved if trucks are so equipped.

To handle freight is expensive. Cost can be reduced by keeping the freight off the floor of the dock. A test showed that it cost 14 cents a ton

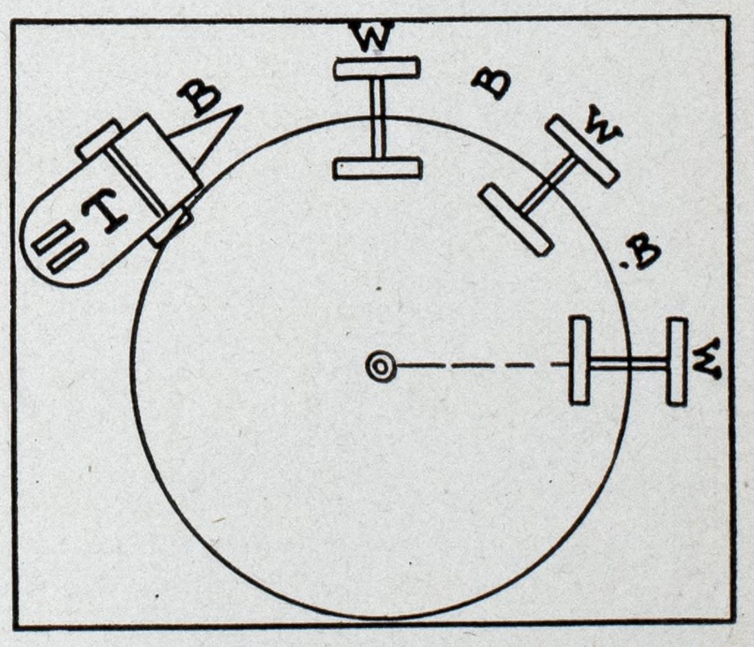


PIEPLATE SLING AN ECONOMICAL WAY OF HANDLING CERTAIN CARGO

to load a truck with firebrick. Each time a ton is handled that expense is incurred. As many as four handlings have been saved on one terminal by keeping the brick on trucks, a saving of 56 cents a ton. By handling tinplate on a pier with skids instead of hand trucks the cost was cut eleven cents a ton because larger units were moved more rapidly.

Why Trailers Trail

THE trailing ability of the various types of trailers or trucks vary in accordance to the perfection of



ILLUSTRATING TURNING QUALITIES OF TRAILERS

their wheels and coupling design. Why a caster type trailer trails is ex-

plained by the diagram, as follows:

Let the circumference of the circle represent the course of some trailers making a 90 per cent turn behind a tractor "T." "W.W" represents the trailer axles and wheels running independently of each other on the axles. The tangent lines "B-B" represent the natural tendency of the trailer wheels to follow a straight line.

By virtue of an articular point of connection between the trailers at "B" it is easily seen that as the tractor keeps circling around the circumference the pull is always toward the center and that the tangent lines are continually changing their point of tangency, so that the outer wheel travels faster than the inner wheel.

It is obvious that with the articular points "B" exactly half way between the axles and wheels the trailers will follow accurately.

Unfortunately, however, when these trailers are following in a straight path, by virtue of the same length of the lever arm from the axles to each particular point, the least swing of any trailer is instantly conveyed to the other trailers in an opposite direction so that the train begins to whip.

To overcome this "whipping" the articular point must be moved either forward or backward to a point where the most accurate trailing can be secured with least tendency to whip.

Rocker Bottomed Truck

THE Universal Atlas Cement Co. uses a two wheel hand truck of special design that increased trucking efficiency 10 per cent. The truck handles seven or eight sacks of cement with the least possible effort on the part of the trucker. The truck is perfectly balanced, standing at an angle of repose on either side of the vertical center.

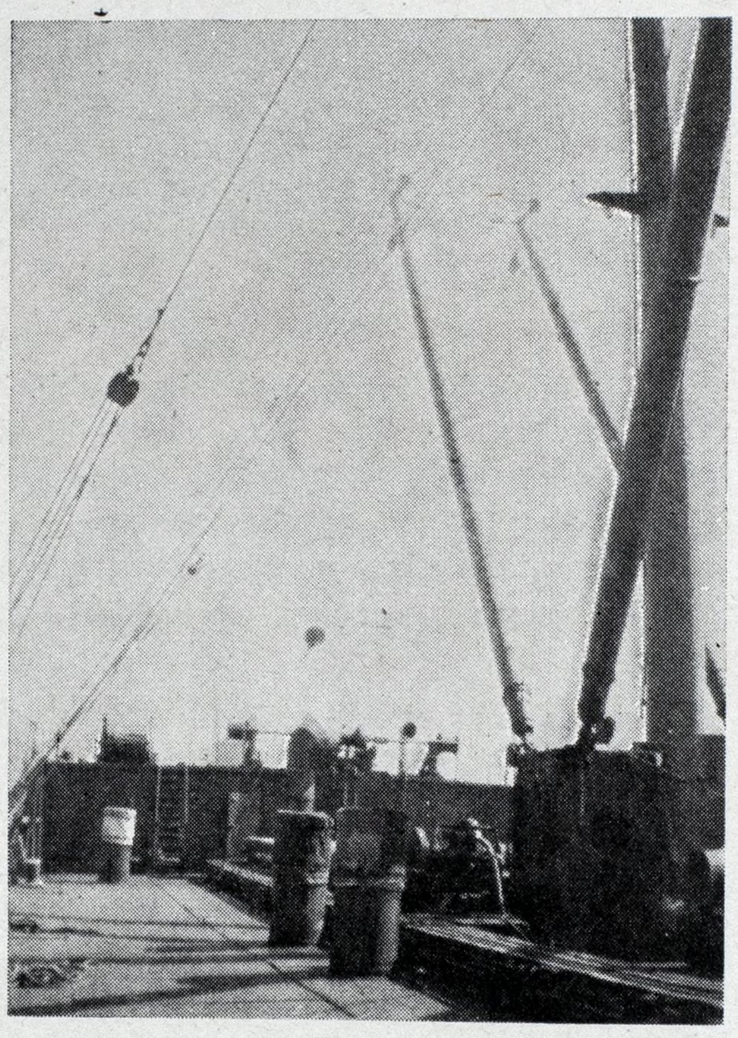


ROCKER BOTTOMED CEMENT TRUCK INCREASES EFFICIENCY 10 PER CENT

The Connecting Lift Up to Seven Tons

THE accompanying photograph shows two booms rigged for handling pieces from four to seven tons. The two derricks are placed along side of each other and at the same height. The cargo fall from one derrick is taken through a single sheaved block and shackeled to other derrick cargo fall, hence the name "connecting lift."

The weight is hanging in the single sheaved block and is handled in the same way as in handling ordinary sling loads. The guy ropes of one derrick should be slacked off and the derrick allowed to swing free as that will insure an even strain on both derricks. The winches can be used both at the same time or alternately, but the shackles connecting the two cargo falls should be kept from fouling either the cargo blocks or the single sheave block.



TWO BOOMS RIGGED FOR HANDLING FROM 4 TO 7 TONS LOAD

This method of rigging for handling moderately heavy lifts can be used at any of the hatches and takes less time and money to rig than the heavy lift gear. One distinct advantage is that the booms can be rigged in this manner without disturbing the work at other hatches.

How Hatches Are Rigged For Starting Work

THE accident prevention department of various West coast shipping employers recently prepared the following interesting study on the subject of how to rig hatches for stevedoring operation. It was prepared under the direction of Byron O. Pickard, safety engineer in charge.

It has been noted that many walking bosses and gang foremen have no definite scheme for preparing or covering up a hatch before and after handling of cargo. In answer to the question of a stevedoring company on, "How do you rig hatches when starting work?" one gang foreman offered the following suggestion. Since this particular foreman had kept his gang busy throughout the year and had had but three minor accidents charged against him his reply deserves careful attention. He said:

"I leave the winches to the winch drivers. They are both good men and know their business. The two offshore men handle the offshore guy; inshore men handle the inshore guy. The two midship men are sailors and they handle the booms, if they have to be slacked off or raised. If the lift is wire, either the hatch tender or I handle it. When the booms are ready I strip off the tarpaulins. Two men outside the hatch coaming and two men on top. If there is a misplaced hatch cover, the men on top have a chance. The last cover is usually light and the two outside men strip this cover off. Then the hatches and beams are taken off. If the hatch is near the gangway so that it isn't too far for them to come, I call two of the dock men to rig the save all, if it is not too heavy. Otherwise, I hoist it up and the hatch tender and I secure it. Then I look things over to see if it is all right."

New Type of Strongback

THE type of self-stowing hatch strongback referred to on page 52 of this issue has a number of definite advantages which may be enumerated as follows:

1. Saving made in labor costs and ship's time in covering and uncovering hatches.

2. The width of the hatch is practically increased from seven to eight inches because the strongback sockets ordinarily fitted to the coamings are eliminated. For the same reason there is less chance of damage to bags and other cargo caused by coming into contact with the edge of the sockets.

3. Injury to men and damage to the shipping cargo by unshipped beams is impossible.

4. Cost of maintaining and repairing strongbacks is reduced.

5. Deck space for strongbacks is no longer needed when hatches are uncovered. This improves safety conditions.

6. Damage to the decks through dragging and dropping strongbacks is eliminated.

Diesel Electric Towboat

Tennessee—New Stern Wheel River Boat Completed for United States Engineers

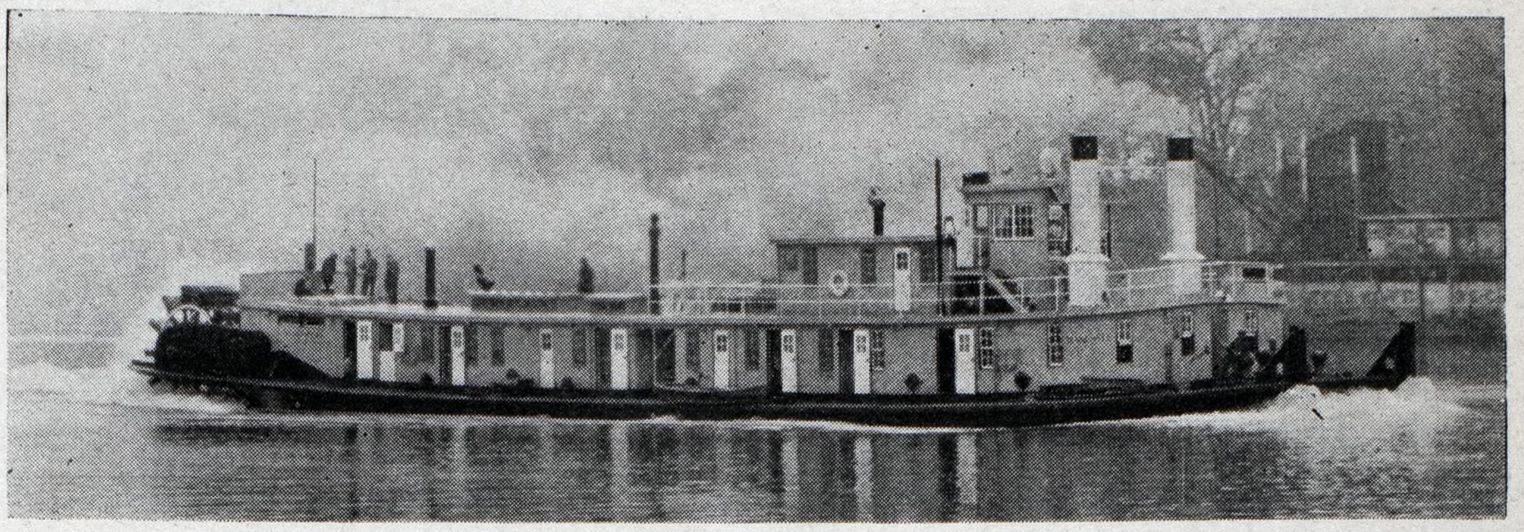
THE diesel electric sternwheel towboat TENNESSEE was recently completed by the Marietta Mfg. Co. at its plant on the Ohio river at Point Pleasant, W. Va. The vessel was delivered on May 5, 1930, to Maj. Lewis H. Watkins, district engineer of the Chattanooga, Tenn., office, at the Wilson Dam sub-office, Florence, Ala.

The TENNESSEE is the latest development in river boat building in the application of diesel electric drives to a split stern wheel. Performance of the boat will be watched with much interest by those interested in the development of river craft.

American Bureau of Shipping rules were followed in the construction of the boat. The hull, which is of steel throughout, has a model head and raked stern. Its molded length is 140 feet 0 inches; overall length, 161 feet 0 inches; molded breadth, 29 feet 0 inches; breadth overall, 30 feet 0¾ inches; depth at side molded, 4 feet 6 inches; depth at center line molded, 5 feet 0 inches; sheer forward, 2 feet 6 inches; sheer aft, 1 foot 6 inches; draft forward 2 feet 8 inches; and draft aft, 2 feet 7 inches.

The shell and deck plating is ¼-inch, bilge plates 5/16-inch. The hull is framed on the transverse system at its forward end and the remainder on the longitudinal or fore and aft system of framing. There are eight hull compartments, two of which carry fuel oil for the main engines. The capacity of the fuel oil tanks is 2000 gallons.

The main deck house is of steel construction with wood interior finish in the crew's quarters. The upper deck house and pilot house are of wooden construction.



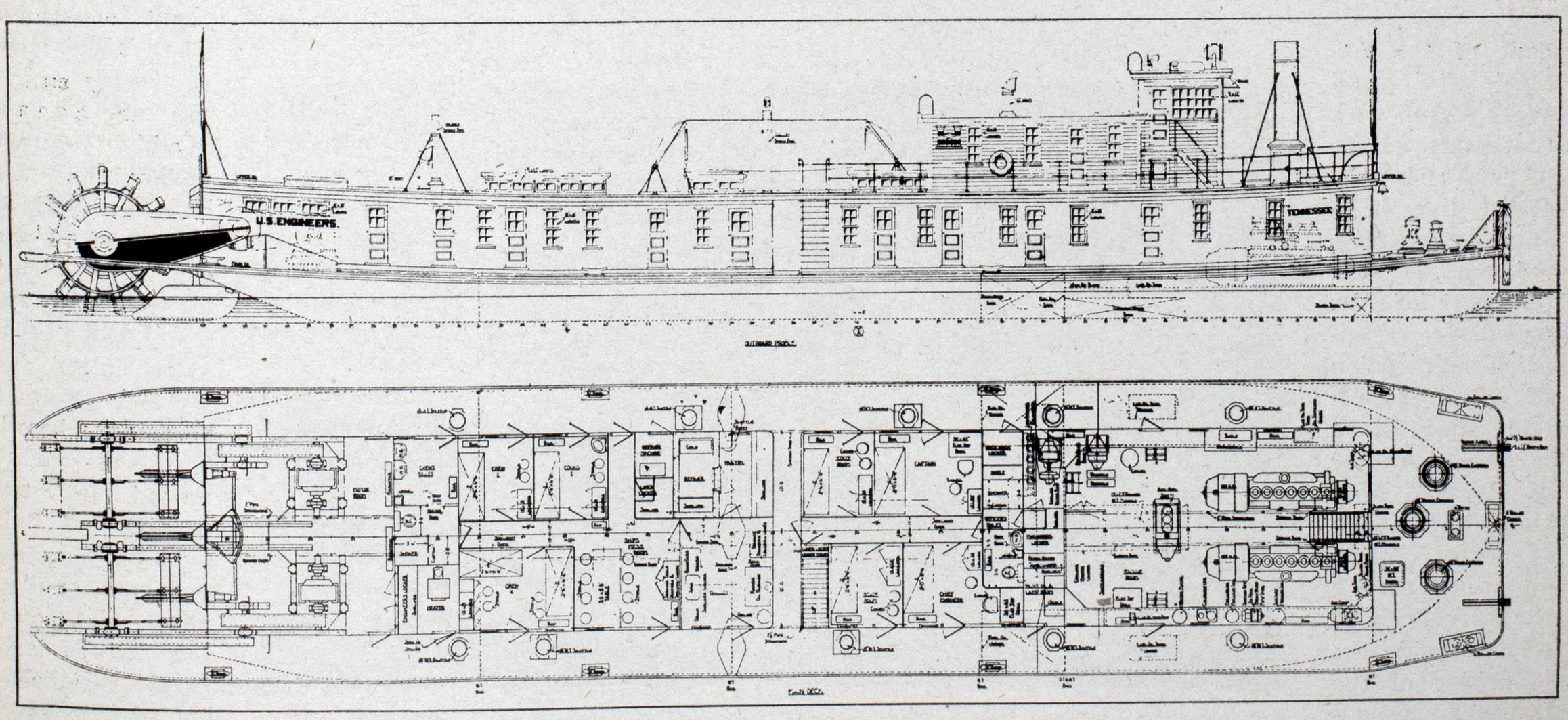
Diesel Electric Towboat Tennessee on Trial Trip April 28 1930

Housed in the main deck house in addition to the machinery space are the galley, refrigerator room, boiler room for heating system, mess room, pantry, stores, baths and showers, and state rooms with sleeping accommodations for fourteen men. The guest or owners quarters in the upper deck house provide accommodations for two men with private bath and mess room.

Two 100-kilowatt Fairbanks, Morse generating sets comprising two cycle six cylinder full diesel engines mounted well forward in the hull are direct connected on common bed plates to 100 kilowatt direct current generators at the after end and 10 kilowatt direct current 115-volt exciters at their forward end. These units provide the power supply for the propulsion of the boat. The diesel engines are controlled from the engineer's stand, while all other controls are at the pilot's stand in the pilot house. The engine room is equipped with a "Lux" fire smothering system supplied by Walter Kidde Co.

The driving motors, two in number, one for each half of the split stern wheel, are of Fairbanks, Morse manufacture of the marine type direct current and shunt wound, rated at 115 horsepower each. These motors are mounted well aft on the hull and drive lay shafts by silent morse chains. The two sections of the stern wheel shaft are driven from the lay shafts by Baldwin double roller chains. All bearings for the lay and wheel shafts are of the S. K. F. self-aligning type.

The engine room auxiliaries include a 12-kilowatt diesel engine driven auxiliary generating set of Cummins make. Centrifugal motor driven pumps of the Jennings type, made by the Nash Engineering Co., are provided for the sanitary, engine circulating water, fire and bilge, and fresh water



Diesel Electric Sternwheel Towboat Tennessee—Built by Marietta Mfg. Co. for the United States Engineers

systems. Motor driven auxiliary air compressor is of Winton make. Circulating water coolers for the main engine are of the multi-whirl two-pass type as made by Griscom-Russell. The automatic electric refrigerating unit is of Frigidaire make.

Oil burning installations on the galley range and the boiler for the heating system enable these units to operate on the same fuel as the main engines.

On the main deck forward are mounted two hand power capstans and one electric motor driven capstan of a capacity of 7000 pounds pull at a rate of 15 feet per minute.

Electric driven power steering gear, as well as hand steering gear for emergency are provided.

During her trial runs and on the delivery trip the TENNESSEE exceeded all test requirements. The boat is remarkably flexible in its handling and maneuvering ability because of the diesel electric drive and the independent operation of the two halves of the split stern wheel. Either or both halves of the stern wheel may be operated as long as one engine and generator are in service.

The boat was designed and built under the direction of the marine design division, engineer department, United States Army, C. H. Giroux, senior engineer, in charge. The engineer department contemplates making exhaustive tests with the boat and will undoubtedly gain much data and information of value to those interested in the stern wheel type of river craft with diesel electric drive.

Oriente, New Ward Liner, Is Launched

THE Ward liner ORIENTE, second in a $10,000,000 shipbuilding program of two sisterships for the company's Havana-New York express service, was successfully launched at Newport News, Va., May 15 at the yards of the Newport News Shipbuilding and Dry Dock Co. in the presence of a large gathering of notables from Washington, Havana and New York including His Excellency Orestes Ferrara y Marino, Cuban ambassador to the United States and Senora Orestes Ferrara y Marino. As the latest pride of the American merchant marine started down the ways, Miss Virginia Hoyt, sponsor of the ORIENTE, broke a bottle over the vessel's bow in the traditional manner and said: "I name thee ORIENTE."

Assisting Miss Hoyt in the launching ceremonies were her two maids of honor, Miss Martha Allen and Miss Katherine Clark. All three are members of Miss Chapin's school. Miss Hoyt is the 15-year old daughter of Richard F. Hoyt, member of the banking firm of Hayden, Stone and Co. and a vice president of the Atlantic Gulf and West Indies Steamship lines of which the Ward line is a subsidiary. Miss Allen is the daughter of Mr. and Mrs. Frederick W. Allen of New York and Miss Clark is the daughter of Mr. and Mrs. Donaldson Clark of New York. Prominent among the guests who attended the launching of the ORIENTE were Hon. Enrique D. Ruiz, consul general of the Republic of Mexico and Senora Ruiz; Senor Jesus Alvarez y Betancourt, vice counsel in charge of Cuban consulate at Newport News, Va.; United States shipping board commissioners Jefferson Myers, S. S. Sandberg and A. H. Denton; Dickerson N. Hoover, supervising inspector general, United States Steamboat Inspection service; Capt. Frank E. Ferris, director of operations, United States shipping board.

Prominent among those who came on from New York were: Franklin D. Mooney, president of the Atlantic Gulf and West Indies Steamship lines, and Mrs. Mooney; H. E. Cabaud, first vice president of the Ward line; John E. Craig, first vice president of the Clyde-Mallory lines, and Mrs. Craig; Mr. and Mrs. Richard F. Hoyt; Capt. Charles A. McAllister, president of the American Bureau of Shipping; H. H. Raymond, chairman of the board of directors of the Atlantic Gulf and West Indies Steamship lines; Enrique Moreno, publisher *El Mundo*, Havana; A. G. Heinsohn, passenger traffic manager of the Ward line; and V. K. Hull, first vice president of the New York and Porto Rico line, and Mrs. Hull.

The MORRO CASTLE, sistership of the ORIENTE, was launched at the Newport News yard on March 5 last and both vessels will be completed in time to enter the New York-Havana express service this fall. Both vessels will have a speed of 20 knots which will enable them to reduce the Ward line's present running time between New York and Havana from 72 to less than 60 hours.

The ORIENTE, like the MORRO CASTLE, is a vessel of 11,300 gross tons, with a length of 508 feet, a beam of 70.9 feet and a loaded draft of 26 feet. Luxurious accommodations will be provided for about 400 first class and 90 tourist class passengers.

The construction of the ORIENTE and MORRO CASTLE is hailed as another triumph for the Jones-White marine act of 1928, which was enacted for the purpose of encouraging and aiding private American interests to build and maintain an adequate merchant marine. The Ward line is already enjoying an ocean mail contract under this act and has obtained a loan of 75 per cent of the cost of the big shipbuilding program from the United States shipping board. The ORIENTE is named for the province of Oriente in the eastern part of Cuba, noted not only for its agricultural richness but scenic beauty.



New Turbo Electric Ward Liner Oriente Launched at Newport News, Va., May 15

Reviews of Late Books

*Le Port de New York dans Son Role Economique**, by Gaston Eyskens, Louvain, Bibliotheque de l'Ecole des Sciences Commercials de l'Universite de Louvain, Rene Fonteyn, Editeur, 1929.

Review by J. Stuart Crandall, C.E.

Monsier Eyskens has pictured the world's first port from the viewpoint of a European economist. It is an excellently documented and thorough study of the commerce, traffic, rates and operation of the port based on statistics up to and including those for 1928 and on an intimate, personal study on the ground.

The first part describes the nature of the commerce, analyzing the ocean, canal, coastal, intercoastal, and passenger traffic; the commercial products handled and their origins; and the economic function of the port in the relation to the movement of these products. The very favorable load factor for both foreign and coastwise commerce is clearly portrayed. The author well points out that for any other country the coastwise domestic commerce would be international.

The second part deals with the causes of the greatness of the port; its heritage from the past; the opening up and growth of the virgin and its natural outlets; the means of communication with the interior and with the ports of the world; the piers, terminals, warehouses and their equipment; and the organization, operation, and administration of the port. The picture of the development of the port is very happily drawn showing the various factors effecting it and the particularly rapid progress after the success of the CLERMONT and the introduction of steam to navigation. Much space is given to the settlement and growth of the hinterland with its three natural outlets, the Mississippi river, Great Lakes—St. Lawrence river, and the Mohawk—Hudson river; and the result of the construction of the Erie canal. The interior means of transportation by rail, canal, highway, and air, are described in detail, and the maritime transportation with world ports is carefully analyzed. There is an excellent description of the organization of the port, its facilities, movement of freight, including the commercial and administrative formalities of export and import operations as well as many other details.

The third part analyzes the principal problems of the port such as railroad net and connections, freight terminals, belt lines, and car floating; rational operation of the piers and equipment and terminal charges. A chapter is well devoted to the rate structure, causes, trends, tariff wars, and competition between ports. Here Monsier Eyskens points out the artificiality of the port differentials which he apparently considers inequitable, but he might have shown that the absorbed free lighterage cost is a tribute the rest of the country pays to benefit New York's export traffic. The final chapter foretells the probable future of the port of New York as affected by the Mississippi river, Hudson's bay, and St. Lawrence canal routes. In conclusion, he believes that the experience of New York clearly shows that of necessity any port must establish definite plans for development years in advance, that the destiny of ports is best controlled by a public body where economists and engineers have a preponderant influence, and that in the Port Authority, New York will find new and fertile initiative for logical development.

Monsieur Eyskens deserves commendation for this timely study, well done. The bibliography is excellent, most complete, and of great value in itself. This book should be in the library of every port engineer and economist. It is to be hoped that an English translation may soon render the information more generally available.

The Pageant of Packets by Garnett Laidlaw Eskew, cloth 314 pages 5½ x 8½ inches, published by Henry Holt and Co., New York City and furnished by MARINE REVIEW, Cleveland, for $3.00 pus 15 cents for postage and in Europe by the Penton Publishing Co., Ltd., Caxton House, London for 15s.

This book is a very illuminating and informative history of the crude beginnings and final development of the steamboat trade on the Mississippi and Ohio rivers. The author's birth within a very short distance of the shores of the "father of waters" accounts for his early fascination and love for the steamboat life on the great river. Beginning with the trials of the early designers and builders of the craft that had little trouble on the journey downstream to New Orleans but were powerless against the mighty current on the return voyage, the story places the credit for designing and building the first steamboat to successfully negotiate the journey, both up and down, upon Henry Shreve, the man who actually created the first successful river steam*boat* as opposed to the unsuccessful (river) steam*ship*, developed by Robert Fulton. The early chapters of the book are devoted to a portrayal of the early days of the Mississippi packets, when Robert Livingston, acquired a monopoly of the trade, and even of the river itself, forbidding all other craft to operate without paying him a tax for the privilege, this state of affairs having been brought about by Livingston's purchase of Louisiana, at the alleged behest of President Jefferson, and his successful attempt to get the sanction of the governors of the river states to grant him the sole right to operate on the rivers.

From Sandy Hook to 62,° by Charles Edward Russell, cloth, 400 pages 5⅛ x 7⅞ inches, published by the Century Co.. New York City and furnished by MARINE REVIEW, Cleveland for $3.50 plus 15 cents for postage and in Europe by the Penton Publishing Co., Ltd., Caxton House, London, for 17s 6d.

This is the story of the New York pilot service, the small craft which for 100 years or more have guided ships in and out of New York harbor and, which have played a crucial part in wars. The setting of the narrative is not on the far reaches of some distant sea but close to the Atlantic coast of this nation. In fact, the exploits which make up the story transpired sometimes with a very few hours' sailing distance of our largest ports.

The opening of the tale begins with the part played by the small pilot boats during the War of 1812. During this international conflict, these craft and others modeled after them played a most important part in deciding the fate of the foreign sea power in that war. From that critical period in our national welfare up to the time of the Great war, the service rendered by the pilot boats has been a record of heroism, self sacrifice and loyalty to a cause.

The author has included in this story the highlights of the past century in the struggle of this nation to free itself from the yoke of a foreign power to its establishment as the foremost power of the world. Details of the great blizzard of 1888 which wrecked eleven of 18 pilot boats which were caught at sea; the puzzling mystery of the WM. J. ROMER the tragic wreck of the E. K. COLLINS and many other interesting events of this country's maritime history.

**The Port of New York and Its Economic Function* reviewed by J. Stuart Crandall, of the Crandall Engineering Co., Cambridge, Mass.

Personal Sketches of Marine Men

Joseph E. Sheedy, Executive Vice President, United States Lines, Inc.

By L. E. Browne



HIS success is based on two old-fashioned precepts: getting the right kind of a start; and making the most of whatever natural talents one possesses.

AS CADET on the old Massachusetts schoolship ENTERPRISE he was taught, under ideal conditions, the fundamentals of practical seamanship and marine engineering.

THE diversity and often great responsibility of positions held, particularly qualify him for managing the greatest marine enterprise so far attempted in America.

JOSEPH E. SHEEDY is an outstanding figure in the American merchant marine. As executive vice president he guides the destinies of the United States lines operating former government-owned transatlantic vessels with the LEVIATHAN as the flagship. One of the youngest of the leaders in the steamship business in this country, he has the attributes of the ideal executive. He thinks clearly and quickly, talks rapidly and issues orders with clarity.

He was born at Pembroke, Me., April 17, 1881 and received his early education in the public schools of Massachusetts. His family moved to that state when he was a youngster. And young Sheedy soon became imbued with the desire to go to sea. Complying with his son's request, his father arranged for him to take a course of training on the old Massachusetts schoolship, ENTERPRISE, converted from an ancient warship used during the Civil war. During his first year aboard the ENTERPRISE, he was educated in the fine points of being a sailor. Concluding that curriculum the cadets were required to make a choice between deck and engine room work. Believing that the engineering field showed greater possibilities, he decided to cast his lot with the engineering section. Alert and competent he soon became first cadet officer in charge of the engineering class. In June 1898 he graduated.

In those days schoolship graduates could not take examinations for a license, so he became an oiler on the S. S. ADMIRAL DEWEY of the United Fruit Co. running between Boston and the West Indies. Later he joined the Army Transport service and served in various grades as engineer on the MISSOURI, ROSECRANZ, SUMMER, SHERMAN and WRIGHT, leaving the service as chief engineer. He then transferred his activities to the Northern Pacific lines. Subsequently he joined the revenue cutter service and received the rank of a lieutenant, junior grade. With this commission, he was chief engineer of the ONONDAGA, MOHAWK and the ANDROSCOGGIN and also made a trip to the Arctic on the THETIS. After returning from the Arctic, he resigned from the revenue cutter service to become the supervising engineer of the Hawaiian Electric Co. in Honolulu. It was not long before he returned to the steamship field by accepting a position as general superintendent and assistant to the president of the Inter-Island Steamship Co. This company, now a subsidiary of the Matson Navigation Co., is engaged in the transportation of passengers and cargo between the different islands of the Hawaiian group.

Returning to the United States he became assistant to the president of the Seattle Construction and Dry Dock Co. and also acted as manager of this concern. Later he was appointed general manager of the Seattle North Pacific Co., shipbuilders. He returned to the Atlantic coast as general manager of the Downey Shipbuilding Co., Staten Island, N. Y.

In 1921 he went to Europe for the first time in a business capacity as European manager for the United States shipping board. He served abroad only a year, being called to Washington to become vice president of the Emergency Fleet Corp. in charge of operations and was appointed a trustee of the shipping board. Remaining in Washington until the Fall of 1924, he again went abroad to take charge of the affairs of the shipping board in Europe and in 1926 returned to the United States to become manager of the Montauk Beach Developing Corp. He was engaged in that work only a short time, having interested a number of capitalists in the development of that portion of Long Island as the

Western terminal for the transatlantic lane when at the request of the United States shipping board he agreed to go to Europe again, where he remained for a year reorganizing the European department, before returning again to the Montauk company.

Serving with the shipping board as head of operations at home and abroad, Mr. Sheedy became particularly familiar with the operations of the United States lines and the American Merchant lines, which logically fits him for his present role as operator.

On Feb. 15, 1929, the United States shipping board accepted the Chapman-Sheedy bid of $16,000,000 for 11 transatlantic liners and Mr. Sheedy became executive vice president of the newly formed company starting work on the great task of taking over this fleet and organizing the personnel to operate it. By the end of 1933 Mr. Sheedy hopes to have in operation two additional ships, larger and faster than the LEVIATHAN, to operate with her on a weekly sailing schedule between New York, Cherbourg and Southampton.

Recondition Vessel for New Service

THE passenger steamer AMERICANA, formerly owned by the Crystal Amusement Co. of Buffalo, was recently bought by Capt. John A. Meseck of New York to run between Rye Beach and Battery Park.

In Buffalo on Lake Erie, where the AMERICANA put in her first years of service, she earned for herself the name, "show boat of America." The vessel can accommodate upwards of 3500 people, which means she is a boat of no small proportions.

The boat is now at the Tebo plant of the Todd Shipyards Corp., where her old coal burners will be taken out and supplanted by the Todd oil burning system, which will give her a speed of 20 miles an hour. The interior will be redecorated, her bottom scraped and a new coat of paint will grace her sides. When the AMERICANA starts on her initial run from the Battery in New York to Rye Beach she will look like new.

In bringing the AMERICANA to New York from Buffalo many difficulties and obstacles had to be overcome. It was necessary to take her through the Welland and St. Lawrence canals. The locks in these canals have an overall width of 45 feet. The hull width of the AMERICANA is also 45 feet and her sponson decks reach out 6½ feet further on either side. In order to get her through the locks it was necessary to cut the three decks off at the hull line and fold them inboard, making them fast with wires running from port to starboard side. This also meant ripping out the captain's stateroom and bath on the top deck.

The hull of the AMERICANA was still a bit too wide and 120 feet of its length at the widest part had to be bent in 4¾ inches to allow a free passage. This was done by removing the hull brackets and heating the plates until flexible enough for turnbuckles to pull the sides in to the proper width.

There are 25 locks in the Welland canal with an ultimate drop of 330 feet and while passing through lock No. 15, the fit was so close that the angle bar was broken off.

After arriving at Montreal the decks were put back in their former positions and the hull jacked out to her regular proportions.

The AMERICANA left for the Tebo yacht basin under her own power down the Atlantic coast and arrived a few days later after an uneventful trip.

Buys Ship Repair Plant

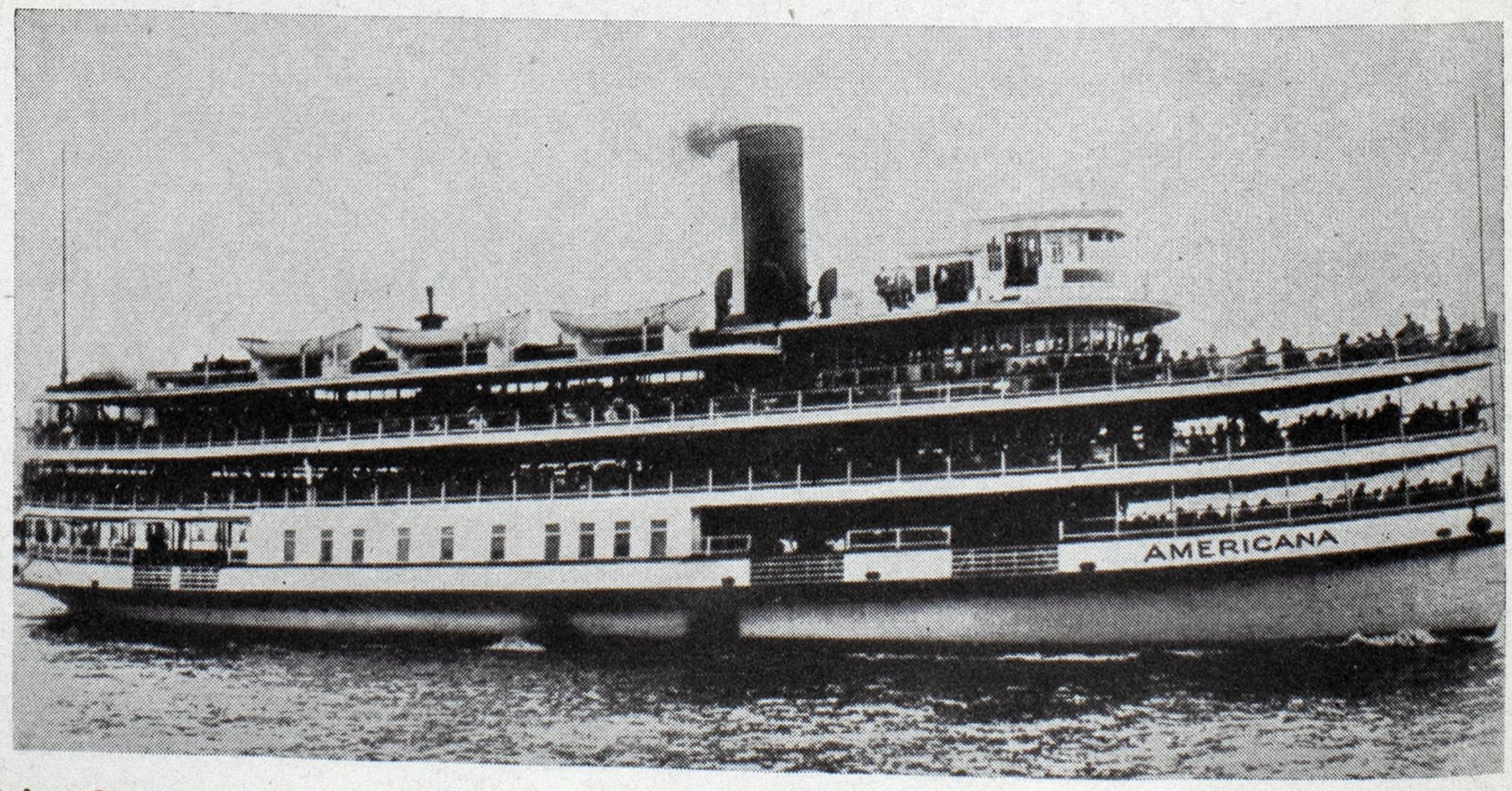
Joseph W. Powell, president of the United Dry Docks Inc., recently announced the purchase by that company of the busines and plants of the Briggs Engineering Co., Brooklyn, N. Y. This property includes a machine shop at 227 Twenty-fourth street and a yacht basin at Flatbush avenue and Avenue U, Brooklyn, N. Y. It will be taken over July 1, and William E. Yandell, president of the Briggs company, will assume charge of the United Dry Docks yacht services under the name of Briggs Yacht Basin at the company's Shewan plant at the foot of Twenty-seventh street, Brooklyn, N. Y. The Briggs Mill Basin plant will be maintained under the present name, Flatbush Avenue Yacht Basin.

"The purchase of the Briggs Engineering Co. property," Mr. Powell said, "will enable the United to give to the yacht owner the same complete building and repair service now accorded all other classes of ships. We have done considerable yacht repairs at our Shewan plant in the past and we intend to feature this class of work now that we have acquired the facilities of the Briggs company."

Board Sells Tug Bayport

Sale of the ocean-going tug BAYPORT to W. G. Coyle & Co., Inc., of New Orleans, for the sum of $56,398 was authorized by the shipping board May 21. The vessel has been operated by the purchaser under a bareboat charter from the board. The BAYPORT is a 150 foot steel, oil-burning ocean tug and is the last of her type in the possession of the Board.





Great Lakes Passenger Vessel Americana Being Converted for Oil Burning. View on Left Shows How Sponson Decks Were Bent to Let Vessel Pass Through Welland and St. Lawrence Canals from Buffalo to New York

Turbines for Lake Ships

(*Continued from Page* 36)

rine turbines gears and condensers. As a matter of fact, the equipment which we would recommend for installation in lake vessels at the present time would be very much like five such equipments which have been operating very successfully on the Inter-Island run in the Hawaiian Islands and which are operated by native Hawaiian engineers and crews.

We think it appropriate here to quote from a statement made by Arthur H. Armitage, general manager of the Inter-Island Steam Navigation Co. in the *Pacific Marine Review*, December 1929 in the article entitled "The Biggest Little Ships," as follows: "We are perfectly satisfied," said he, "The ship WAIALEALE pleases us in every way. She handles excellently and steers easily. Her geared-turbines have functioned well at Ahukini, her principal port of call at Kauai, a cramped and dangerous harbor, where much maneuvering is necessary and where steam must be maintained at all times for a possible hurried exit. Her engines have had to perform well there. So far as we can see, they are fully the equals of reciprocating engines in maneuvering."

We feel that we must progress, not stand still, in our engineering efforts and that this same feeling should actuate ship operators, who after all, have the most to gain by being progressive and by using modern, efficient machinery to propel their vessels. While it is not feasible to include in an article of this nature, complete detailed calculations and figures, such information is always available to interested parties.

Important Events of 1929

In the annual report of the president of the National Council of American Shipbuilders, the following are listed as important events in world shipbuilding during 1929 worthy of record:

The advent of the BREMEN, a new blue-ribbon ship on the Atlantic.

The continued improvement in fuel economy in large ships.

The use of higher steam pressures and a higher degree of superheat.

The extension of the system of electric propulsion as a main motive power.

The growth of diesel drive on new vessels and the completion of the shipping board's dieselization program under which 20 war-time built vessels have been converted to direct diesel drive and three to diesel-electric drive.

The extension of the use of pulverized fuel. Two new vessels and one converted vessel have been equipped in the United States for the use of such fuel.

The international convention on safety of life at sea, the recommendations of which are now before congress for ratification.

The enactment of the load line law for vessels in the foreign trade.

The adoption of additional standards for marine use through the continued activities of the Marine Standards committee.

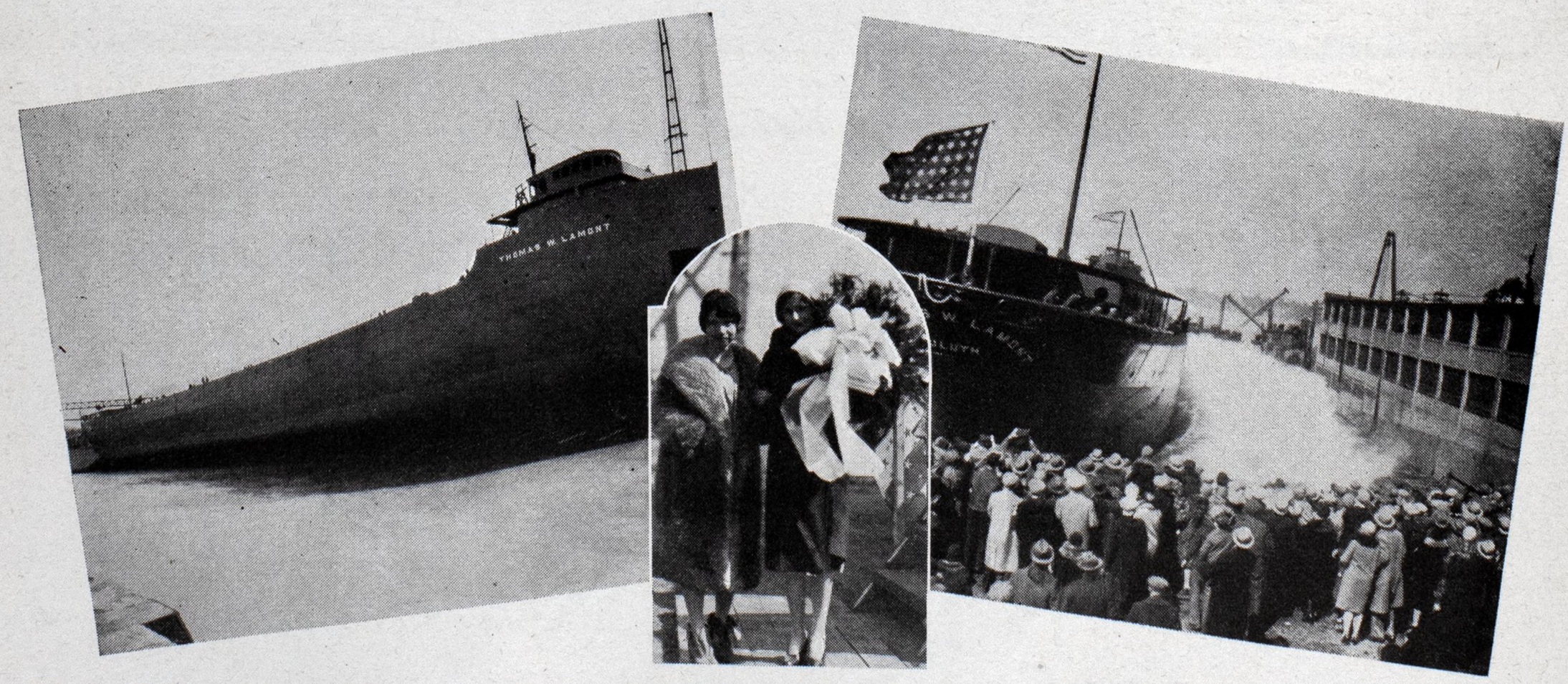
Delegates Attend Load Line Conference

Members of the American delegation to the International Load Line conference called in London on May 20 included the following: H. B. Walker, president American Steamship owners association; David Arnott, chief surveyor, American Bureau of Shipping; S. D. McComb, manager Marine Office of America; Robert F. Hand, vice-president and assistant manager, Standard Shipping Co.; H. C. Towle, Bethlehem Shipbuilding Corp.; Laurens Prior, technical assistant in the bureau of navigation of the department of commerce; Capt. A. F. Pillsbury, naval architect; James Kennedy, marine department, Gulf Refining Co.; H. B. Warley, vice-president Ore Steamship Co.; David W. Dickey of San Francisco and George A. Smith of the American Bureau.

Nineteen other nations have accepted Great Britain's invitation to attend the conference, which will draft uniform regulations to govern all vessels engaged in international voyages.

Board Sells S. S. Scantic

The shipping board May 21 authorized acceptance of an offer of the American Scantic Line. Inc., New York, for purchase of the S. S. SCANTIC for the sum of $67,000. This vessel was severely damaged by fire at New Orleans in March and the offer of the American Scantic line, which is owned by Moore & McCormack, Inc., is made on an "as is, where is" basis.



Thomas W. Lamont, Launched at Toledo Shipbuilding Co., Inc., Toledo, O., March 22—Sponsor Miss Virginia Strom, Daughter of H. C. Strom, Traffic Manager, Pittsburgh Steamship Co., Owner—See Item, Page 66, May Marine Review

Shipments of Pig Iron

Shipments of pig iron from lower lake furnaces to western markets by Great Lakes both made a late start this season as compared with recent years. About 10,000 tons has been contracted and shipped from the East to Chicago - Milwaukee consuming ports, as against more than twice that amount in recent preceding years.

The movement was started with a 7000-ton cargo of pig iron, one of the largest pig iron cargoes ever shipped by Great Lakes boat, which was received at the National Terminals Corp. docks at East Chicago, Ind., late in May. The shipment was made in an ore vessel. Later an 1800-ton cargo was received from Buffalo, and a 2000-ton cargo was shipped from Buffalo to Milwaukee as a consignment direct from furnace to consuming interests.

Preparations are being made to ship a cargo each of English spiegeleisen and English ferromanganese direct to Chicago and Milwaukee by way of Montreal and the St. Lawrence river. It is understood that western brokers were unsuccessful in buying an expected block of about 15,000 tons at Buffalo for early shipment to Chicago, but, according to present plans, a fair movement will develop later in the season.

Company to Lease Dock

According to reports, the Cleveland-Cliffs Iron Co. is to lease the million-dollar Baltimore & Ohio ore dock on the Black river. Officials of the Cleveland-Cliffs Iron Co. are reported to have said the deal would go through soon. The Cleveland-Cliffs Iron Co. operates a fleet of 21 lake freighters

---

Launch New Tug

The new tug NEVADA was launched at the yard of the Great Lakes Towing Co. in Cleveland on May 17. This vessel makes the fifth launched within less than two years by this company. This vessel is of the larger type and is built to the standard set by the company. It has not definitely been settled whether she will be stationed at Duluth or Chicago.

New Ferry Transport

A new ferry is to be operated this season as a passenger and auto transport by the new Erie Isles Ferry Co. of Put-In-Bay. This vessel, the FREDRICA of Frederica, Del., is to be operated between Catawba Island and Port Clinton and the south shore of Put-In-Bay island. The vessel is to be taken through the St. Lawrence river to Lake Erie and is to be placed in operation on June 20. The FREDRICA has a capacity of 20 automobiles and 200 passengers. Captain Ezra Bickford of Put-In-Bay is to be master of the vessel. The new company, the Erie Isles Ferry Co., replaces the Put-In-Bay Auto Ferry Co. which was recently dissolved after ten years operation of an auto ferry between Catawba and Put-In-Bay. The new company is to be incorporated with capital stock of $30,000. The officers are: Henry Fox, Put-In-Bay, president; Rudolph Fisher, Middle Bass, vice president; William Schnoor, Put-In-Bay, secretary and treasurer; and George F. Lonz of Middle Bass island, manager.

Permits Larger Cargoes

According to announcement made May 14 by the shore captains committee of the Lake Carriers association lake vessels will be moving larger cargoes this year due to an increase in draft of the vessels. According to the bulletin the draft for the St. Mary's river for all vessels trading to and from Lake Superior will be 20 feet. A draft of 20 feet six inches was recommended for boats operating on Lake Sinclair and the Detroit river and loading between Lakes Erie and Michigan. This marks an increase in draft from 19 feet 9 inches and will result in greater tonnage for each vessel.

Great Lakes Lifeboats

Lifeboats destined for service on the Great Lakes and built at Baltimore early in May were manned and sent through inland waterways to their new posts under their own power, according to James F. Hottel, commandant of the Curtis Bay coast guard depot. The new boats are 36 feet long and powered by gasoline motors giving them a speed of nine and one-half miles an hour. The boats are unsinkable and self-righting. There is an arrangement whereby rough seas can be smoothed by means of a fish-oil spray. Eight of these boats have been built at Baltimore during the past year.

Form New Company

The Port Clinton Marine Service Co. was incorporated May 17 at Columbus for $10,000. The new company, office of which will be in the Stahl building at Fremont, will engage in dredging, towing and piling.

Lake Shipping Man Dies

Lynford E. Geer, aged 61, vice president and treasurer of the Manitowoc Shipbuilding Corp., Manitowoc, Wis., vice president and a director of the Goodrich Transit Co., Chicago, and associated in official capacity with a number of other shipping and industrial enterprises, died May 11 at Edgewater hospital, Chicago, after a short illness of heart disease.

Mr. Geer came to Manitowoc in 1902 and with the late Elias Gunnell and Charles C. West purchased the old Burger shipyards and started the nucleus of the Manitowoc Shipbuilding Corp. and allied interests. He was a native of Corry, Pa., the son of Capt. and Mrs. Elliott N. Geer, who still survive. After receiving his early education he came west to Chicago in 1890, where he became stock keeper with the old Chicago Shipbuilding Co., operating a shipyard at South Chicago. Following the war, in which his compauy expanded in the building of vessels for government use. Mr. Geer was made vice president and treasurer.

Mr. Geer also was treasurer and a director of the American Sand and Gravel Co., Chicago; a director of the Medusa Portland Cement Co., Cleveland, of which the Manitowoc Portland Cement Co. is a unit, a director of the Manitowoc Foundry Co., Manitowoc; a director of the Rockport Steamship Co., Manitowoc; and was associated in official capacity with the Cement Transit Co., and the Great Lakes Sand Co. He also was one of the directors of the General Navigation Co., New York.

Mr. Geer was a member of the Society of Naval Architects and Marine Engineers, the Engineers club, of New York, and many other organizations. He was active in civic work, having served on the Manitowoc board of education before taking up his residence in Chicago five years ago.

American S. B. Co. Busy

The American Ship Building Co. has closed a contract to reconstruct the fire tug W. S. GRATTAN for the city of Buffalo and also to build a car float for the Canadian Pacific railway. The work of rebuilding the tug will be carried out at the Buffalo Dry Dock Co. yard in Buffalo. The float will be built at the Lorain yard of the company.

As a new departure, the American Ship Building Co. has a contract to build two marine engines for a government-owned steamboat line, operating on the Mississippi river.

Merchandising Terminal

(*Continued from Page* 52)

of 73 feet 8 inches. The roof is of planks covered with tar and gravel. The shed doors are of the sliding type with the exception of the driveway doors which are of the roller type. The doors are constructed of metal frames with galvanized iron sides.

The covered driveway is 20 feet wide. The space between the edge of the pier and the shed is 18 feet 6 inches on the sides and 20 feet 5 inches on the outer end. A railroad track runs along the outer edge of the pier on the west side. The shed roof projects over this area about 10 feet, giving protection to truckers during inclement weather. The headroom within the shed is 13 feet.

The saw tooth loading and unloading platform for street trucks is provided for convenient and rapid dispatch of trucks, the indentation being of such depth that a truck may be placed alongside the platform in one indentation and if there is a trailer it can be placed in an adjoining indentation. These indentations or "saw teeth" are 8 feet 9 inches by 15 feet 9 inches.

This type of platform increases the space in the driveway as compared with the straight edge platform. With the straight edge platform, the truck would be at right angles to the platform and would project further into the driveway. Trucks can get away quicker from the saw tooth platform and can load or unload from the end or the side of the truck with equal facility. There is space for 41 trucks and trailers.

To further facilitate handling of trucks a turning area 72 feet in diameter is provided half way down the driveway. The "saw teeth" along the driveway face the turning area. The platform floor is 3 feet 6 inches above the driveway. This height was determined upon by measuring motor truck platform heights and by comparison with railroad terminals.

Trucking cargo is facilitated by the provision of excellent floors. The base is of reinforced concrete designed to carry a load of six hundred pounds a square foot. This will be covered with one and one-eighth inches hardwood, providing an ideal surface for trucks.

Seventeen ramps (cut gangways) are provided on the sides and end of the pier. These range in width from 8 to 16 feet and are spaced so as to accommodate the various types of ships operated by the Canada Steamship lines. A portable gangplank or apron is installed in each ramp. Five ships can be handled at one time, two on each side and one on the end of the pier.

Four electrically-operated monorails of five tons capacity are provided. Three run across the dock from one ramp to another. The fourth runs over a ramp on one end only. This equipment will be used for handling heavy pieces across the terminal and to and from trucks and railroad cars. Heavy pieces that cannot be economically trucked into or out of the ship will be handled overall with ships booms.

Skids and gasoline and hand lift trucks together with tractors and trailers, will be provided for handling cargo on the terminal and in the ships.

The use of this equipment in the ships will be aided by the elevators with which the fleet of the Canada Steamship lines is being equipped as fast as conditions permit.

Three flush platform automatic scales will be installed in the shed. The office is to be housed in a building which is being built separate from the freight shed.

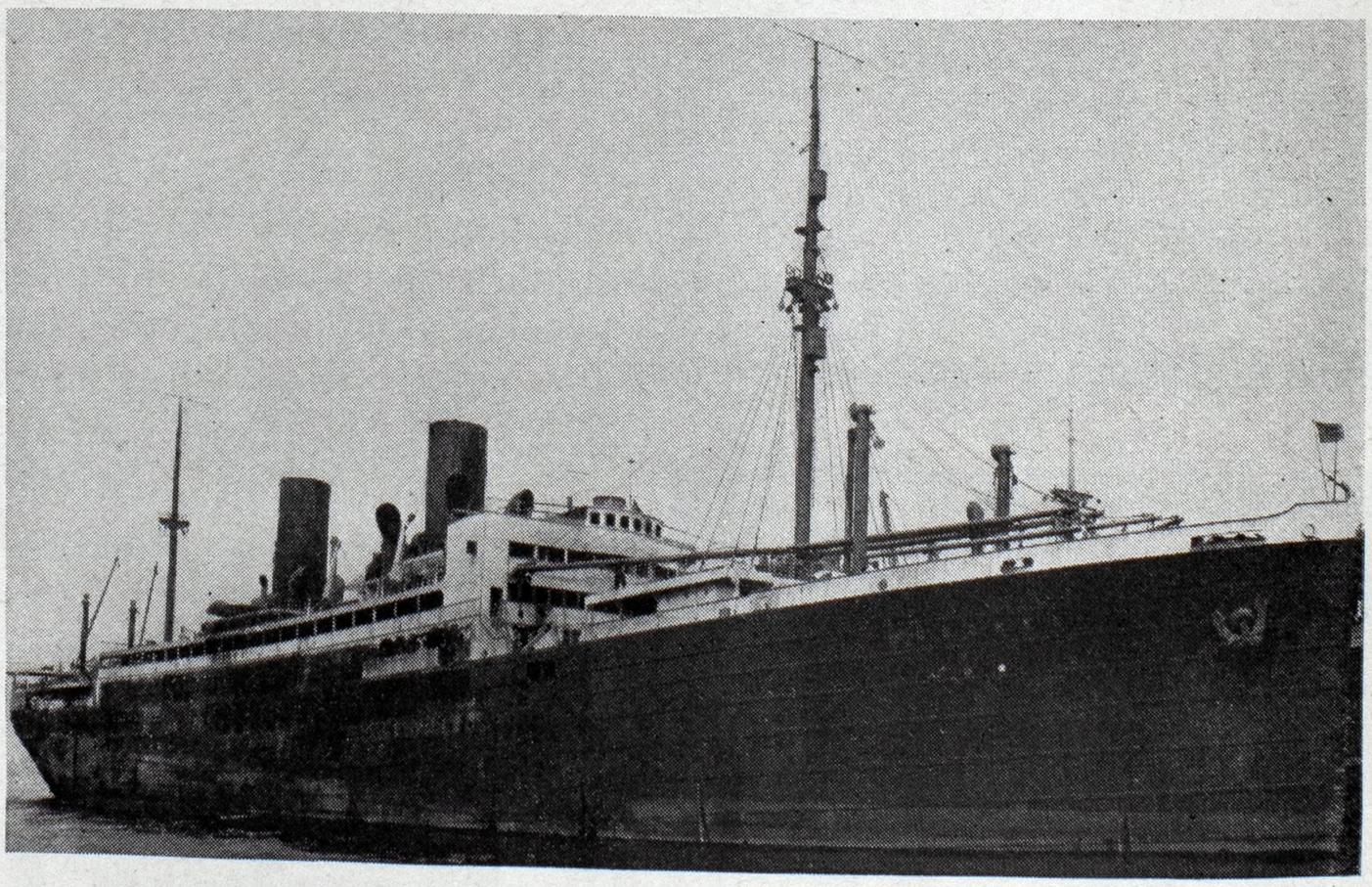
The lighting in the shed will be provided by three continuous monitors running the length of the shed. Water service both for supplying water to ships and for fire protection, will be provided so around the entire dock. Electrical power will be provided so that ships laid up for the winter may be supplied with light, and with power for small tools, without the necessity of generating power on the ship.

German Liner Reconditioned After Fire

HAVING undergone temporary repairs at the Morse plant of United Dry Docks Inc., the North German Lloyd liner MUENCHEN, which burned at her pier last February, has sailed for home under her own power. The principal item in the reconditioning to stiffen the ship for her voyage home was the installation of a steel framework in No. 6 hold, where the fire and explosions caused the greatest damage. The framework was constructed of 12-inch channel beams and extended across the lower hold and 'tween decks, connecting with the ship's sides.

Approximately 80,000 pounds of steel were used in the framework. Heavy wooden supports also were installed to strength D, E and F decks.

Every opening caused by fire and explosion in the deckhouse was covered over and made watertight. All loose planking on decks left in bad condition by the blaze was removed and the exposed decks given a coat of cement.



No repairs were made to the damaged passenger accommodations but temporary living quarters were constructed for the crew that took the MUENCHEN to Germany.

The ship caught fire Feb. 11 and was a spectacular blaze for many hours. Two men, the pilot and a ship's electrician lost their lives.

To Sell 45 Broadway

The shipping board on April 30 authorized the Merchant Fleet Corp. to prepare advertisements inviting sealed bids for the purchase of 45 Broadway, New York, which property has been utilized by the board for the New York district offices of the Fleet corporation. The offices of the United States lines also are located in this building.

American export trade last year exceeded $5,000,000,000 for the second consecutive year, surpassing the high mark of 1928 by $112,906,000, as shown in a bulletin on *Our World Trade* issued April 24 by the foreign commerce department of the Chamber of Commerce of the United States, Washington. Last year's exports were the largest since 1920 and for seven years the trend of our export trade has been generally upward.

In the April issue of MARINE REVIEW, page 31 in the description of the river towboat DWIGHT F. DAVIS, A. R. Wurtele is noted as naval architect. We have been since informed that Mr. Wurtele was the chief engineer of the Federal Barge line and that the naval architect was V. M. Friede, who designed this boat under Mr. Wurtele's general supervision, the latter being head of the department.

Ships to be Sold for Scrap

The shipping board on April 30 authorized acceptance of an offer of $68,460 from the Boston Iron & Metal Co., Baltimore, Md., for six vessels to be scrapped. These ships are located in the Gulf, five at New Orleans and one at Mobile, Ala., and constitute the remainder of the laid-up fleet in that section. The vessels are as follows with the individual deadweight tonnage noted in each case.

FISHKILL, 8822 deadweight tons; BAVINGTON, 8756 deadweight tons; WEST COAST, 8842 deadweight tons; WEST SHORE, 8800 deadweight tons; WESTHAMPTON, 8800 deadweight tons; WESTFIELD, 8644 deadweight tons.

Twin Screw Motor Tanker South Africa

THE twin-screw oil tank motorship SOUTH AFRICA ran successful trials off the mouth of the River Tyne on May 8. She was built by Swan, Hunter & Wigham Richardson, Wallsend-on-Tyne for the A/S. Noruega, Oslo, managed by Leif Hoegh, and has been chartered for a term of years to the Texas Co., New York. The construction of the SOUTH AFRICA was supervised by Kitts & Kennaugh, consulting engineers and naval architects of Liverpool and Sunderland. She holds a certificate of the highest class by Lloyds register and has been built on the longitudinal system of framing. Designed to carry oil in bulk her deadweight capacity is about 13,700 tons. Her overall length is 499 feet, her breadth 65½ feet, and molded depth 39¼ feet. A center line longitudinal bulkhead divides the oil holds so as to form twenty main tanks with expansion trunks and auxiliary trunks in the tween decks. The total tank capacity is enough to load the full weight of light oil.

The pump room amidships contains two powerful duplex oil pumps supplied by Clarke, Chapman & Co. of Gateshead, and each is capable of discharging 350 tons of water an hour. The lines of pipes are laid in duplicate, and oil can be transferred from any one compartment to another or discharged simultaneously from each side of the ship.

Large deckhouses amidships give roomy and comfortable quarters for the captain and officers, the engineers and crew being housed in the after end of the ship. All the accommodation is in accordance with the requirements of Norwegian law.

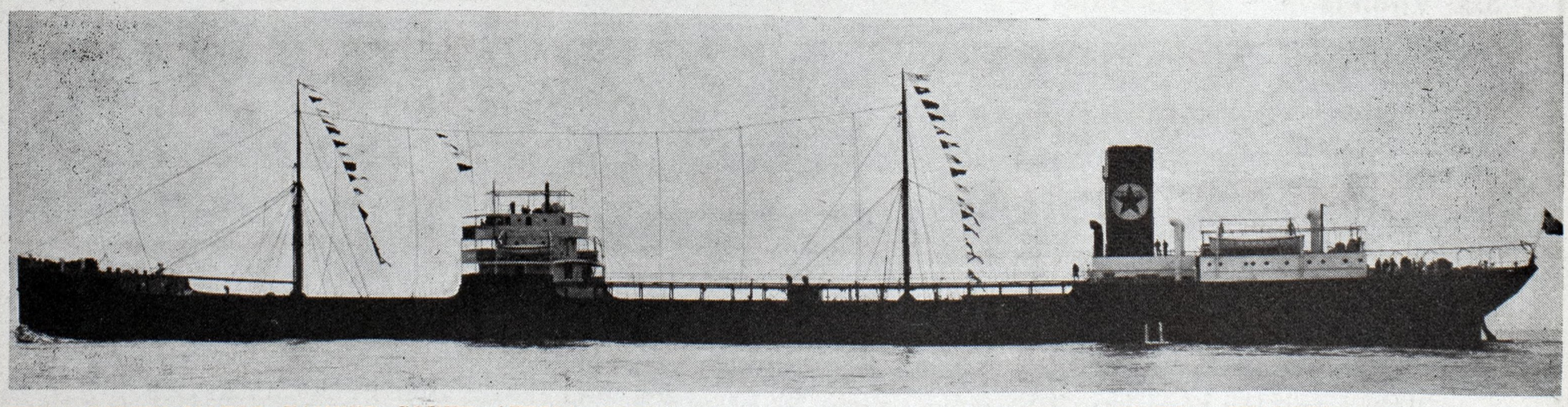
Diesel Propelling Machinery

The propelling machinery of the SOUTH AFRICA consists of two sets of the well known and successful Wallsend-Sulzer two-stroke cycle oil engine, built by the Wallsend Slipway & Engineering Co., Wallsend-on-Tyne. The engine room is in the after end of the ship and the oil fuel carried is sufficient for a voyage of 20,000 miles. There are installed two oil-fired cylindrical auxiliary boilers for providing steam for the pumps, the steering gear, winches and windlass. One of these boilers uses the heat from the main engine exhaust gases.

The collective brake horsepower of the engines is 3600 and their construction follows the usual standard Sulzer design. The thrust blocks are of the single collar type and the propellers are four bladed and of solid bronze. A scavenge air pump and a three-stage air compressor are placed forward of each main engine, these units being worked by cranks which are extensions of the main crankshafts. The lubricating pumps for the piston rod crossheads and for the main bearings are placed at the forward end of each engine.

There is a very ample installation of auxiliary machinery, such as pumps for the bilges, ballast, and for general service. There are also two fuel transfer pumps and an emergency forced lubrication pump.

During the official trial run at sea there were present Mr. and Mrs. Leif Hoegh, Mr. Drake of the Texas Co. of New York and Mrs. Drake, and Mr. Kitts, representing the owner. The builders were represented by C. S. Swan, director of Swan, Hunter, & Wigham Richardson, Norman M. Hunter, general manager of the Wallsend Shipyard, and Frank Piercy and Mr. Maller of the Wallsend Slipway & Engineering Co. The machinery worked to the entire satisfaction of all concerned and the mean speed attained was well above contract requirements. After the trials the SOUTH AFRICA left for Port Arthur, Tex., to load oil for South African ports.



TWIN SCREW MOTOR TANKER SOUTH AFRICA—BUILT IN ENGLAND FOR NORWEGIAN OWNER—CHARTERED TO TEXAS CO.

Marine Review

The National Publication Covering the Business of Transportation by Water

JUNE, 1930

OXWELDING



. . the foe of friction

INDUSTRY no longer scraps metal parts that have become badly worn. By oxy-acetylene welding such parts are readily built up to size and returned to service as good as new.

Often wear indicates the desirability of special qualities in the wearing surfaces. Oxwelding provides a rapid and effective means of applying bronze as well as abrasion resisting materials such as Haynes Stellite, thus minimizing the necessity for further renewal.

Millions of dollars a year are saved in American industry by oxwelding — the foe of friction.

THE LINDE AIR PRODUCTS COMPANY, THE PREST-O-LITE COMPANY, INC.
OXWELD ACETYLENE COMPANY, UNION CARBIDE SALES COMPANY,
Units of UNION CARBIDE AND CARBON CORPORATION

General Offices . . . . . New York UCC Sales Offices . . . in the Principal Cities

65 Linde plants . . . 48 Prest-O-Lite plants . . . 174 Oxygen Warehouse stocks . . . 156 Acetylene Warehouse stocks . . . 42 Apparatus Warehouse stocks . . . 245 Union Carbide Warehouse stocks

Under Construction at—
Newport News

The Largest and Highest Powered American—Built Liners

THE insistent demand for increased speed in transportation is by no means confined to rail, highway and air travel. All the leading maritime nations are busily engaged on new ship designs to gratify the public's desire for faster ocean service.

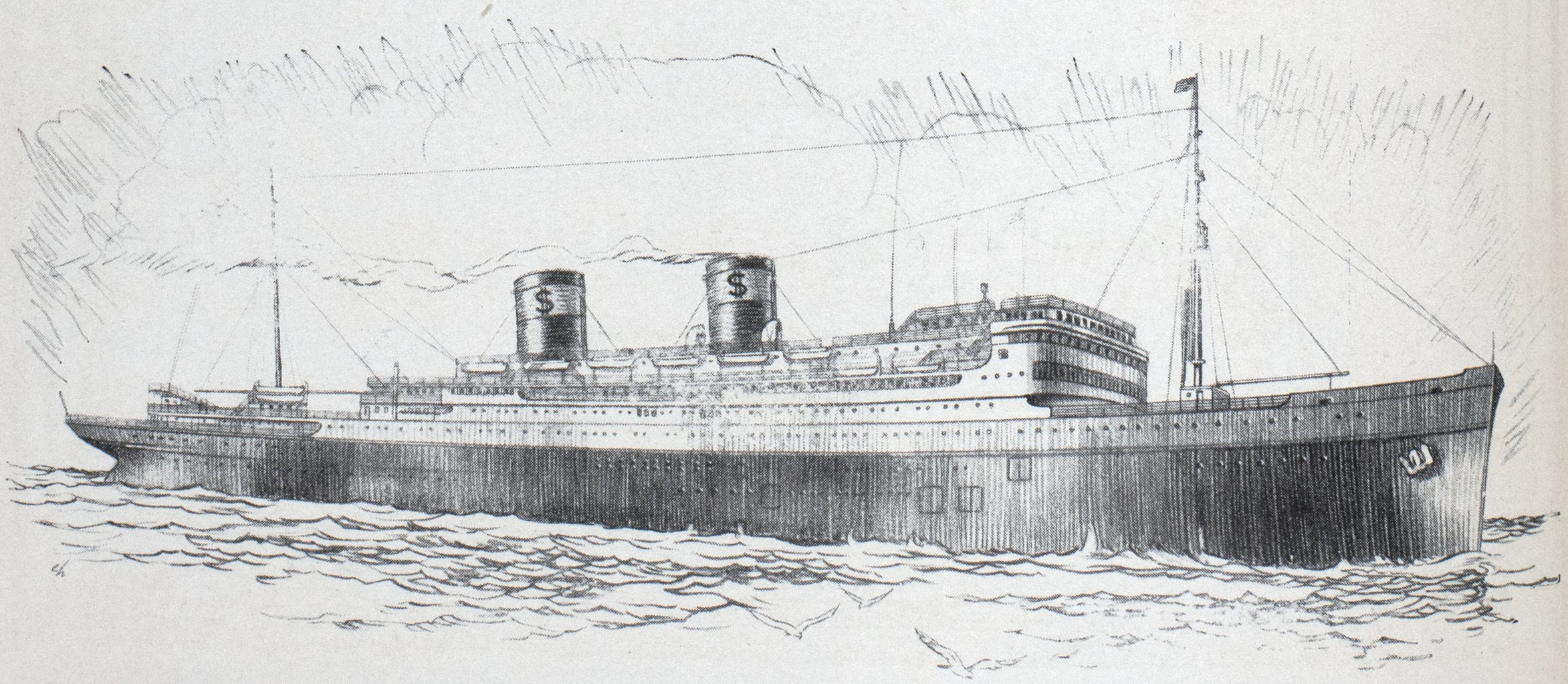
American steamship companies are wide awake to the present day requirements. Two of the largest and highest powered liners so far built in the United States are now under construction at Newport News.

In placing this contract the Dollar Steamship Lines, Ltd., Inc. gave careful consideration to the yard facilities—scientific organization and the character of the ships built at Newport News as well as the excellent design of the vessels proposed for their requirements.

"SHIPS OF CHARACTER"

Newport News Shipbuilding and Dry Dock Company

Newport News, Va. 233 Broadway, New York City



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BUSCH-SULZER Motorships

Are Continuing their Successful Operating Records

E. T. BEDFORD	S.O. (N. J.)
SAWOKLA	U.S.S.B.
CITY OF DALHART	U.S.S.B.
CITY OF RAYVILLE	U.S.S.B.
YOMACHICHI	U.S.S.B.
WARD	U.S.S.B.
CITY OF ELWOOD	U.S.S.B.
LAKE ORMOC	Ford Motor Co.

According to Lloyd's Reports

78¾% of Ships from 8,000 to 25,000 Tons

Building Throughout the World March 31, 1930

ARE DIESEL SHIPS

SIZE	Diesel	Steam	% Diesel
8,000 to 9,999 Tons	54	16	77%
*10,000 to 14,999 Tons	25	6	80%
15,000 to 19,999 Tons	6	0	100%
20,000 to 24,999 Tons	4	2	66%
Totals.....	89	24	78¾%

* 4 of the 6 Steamers are building in the United States. The 25 Motorships are being built by: Germany 6; Great Britain 5; Japan 5; Holland 3; Spain 3; Italy 2, and France 1.

BUSCH-SULZER

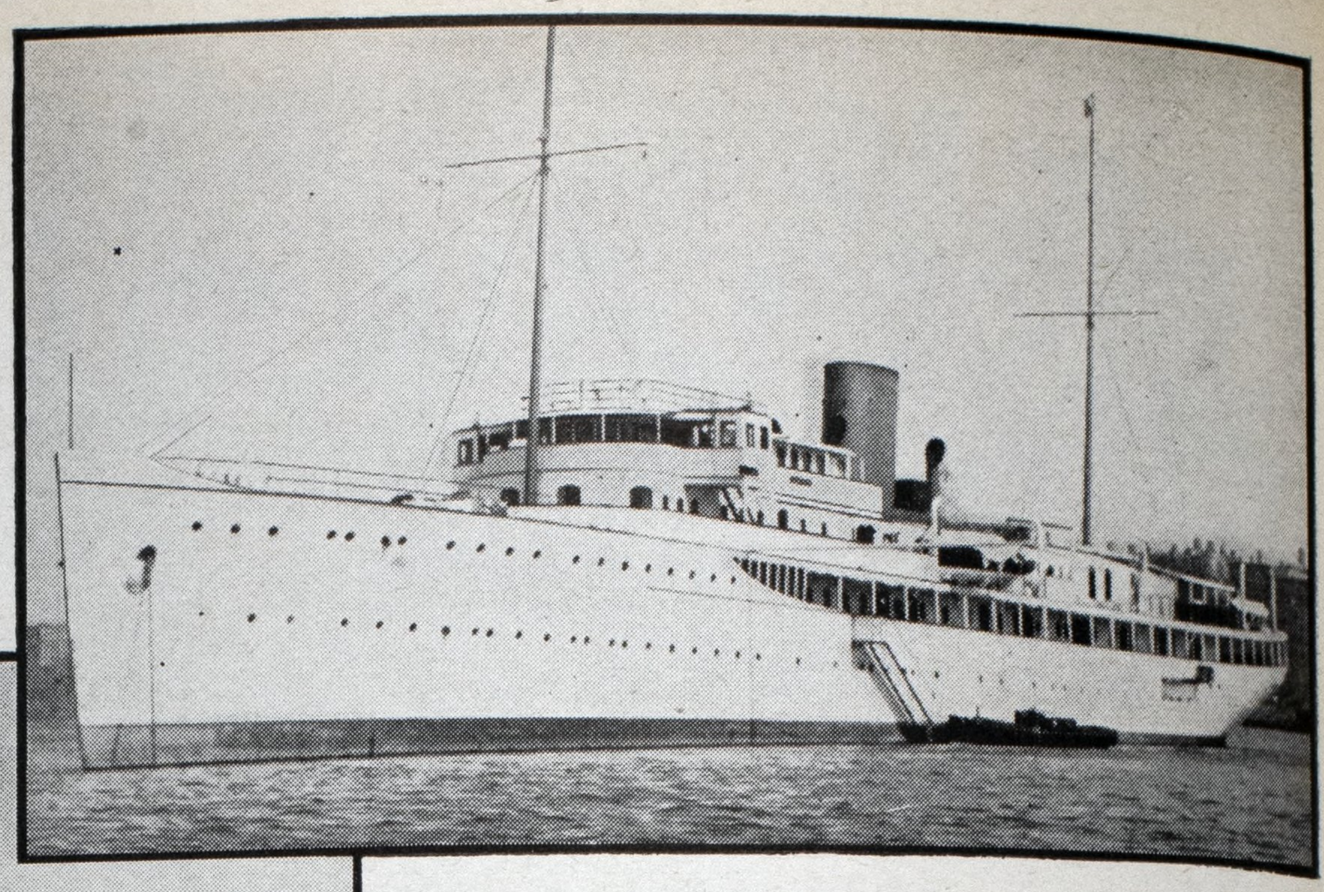
DIESEL BUILDERS IN AMERICA SINCE 1898

Over 3,500,000 HP Sulzer-Type Diesels in Service and on Order

BUSCH-SULZER BROS.-DIESEL ENGINE CO., ST. LOUIS, MO.

ORION

Orion (right), largest privately owned yacht afloat. Built at Kiel, Germany, she measures 330 feet with a beam of 46 feet—displacement 3400 tons.



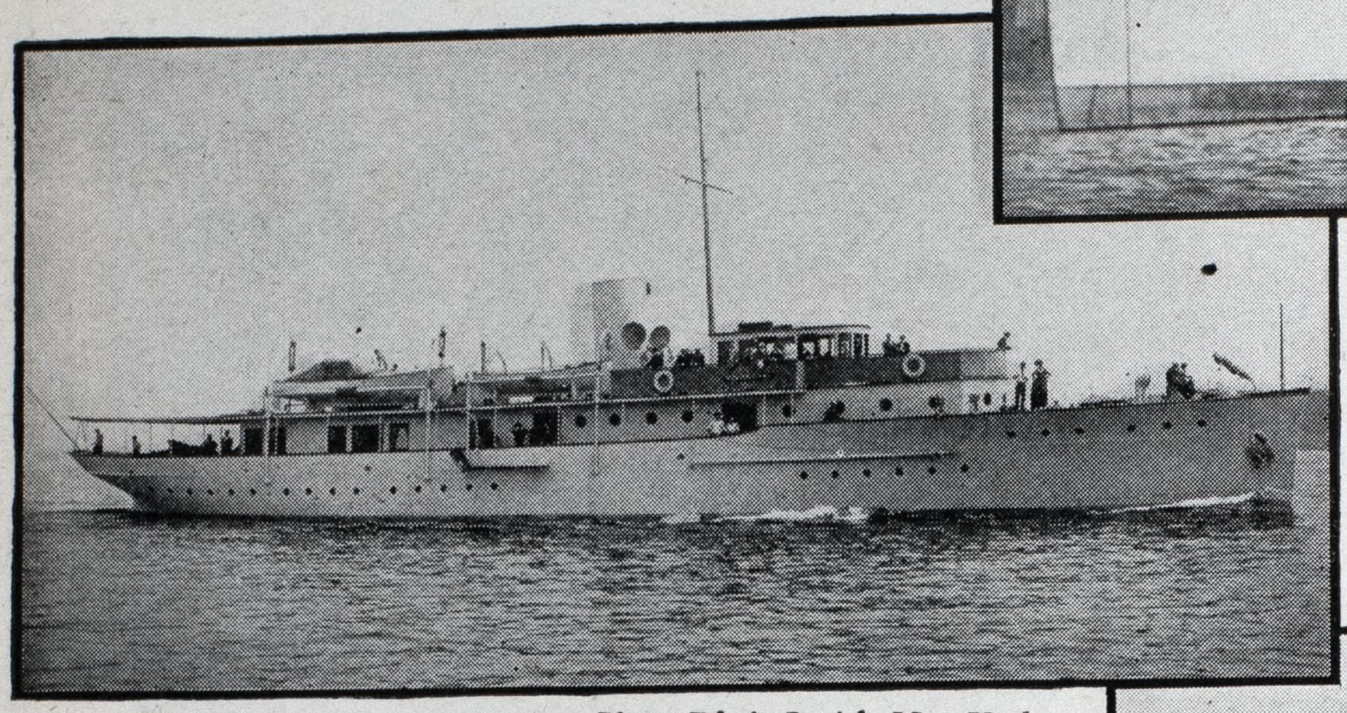


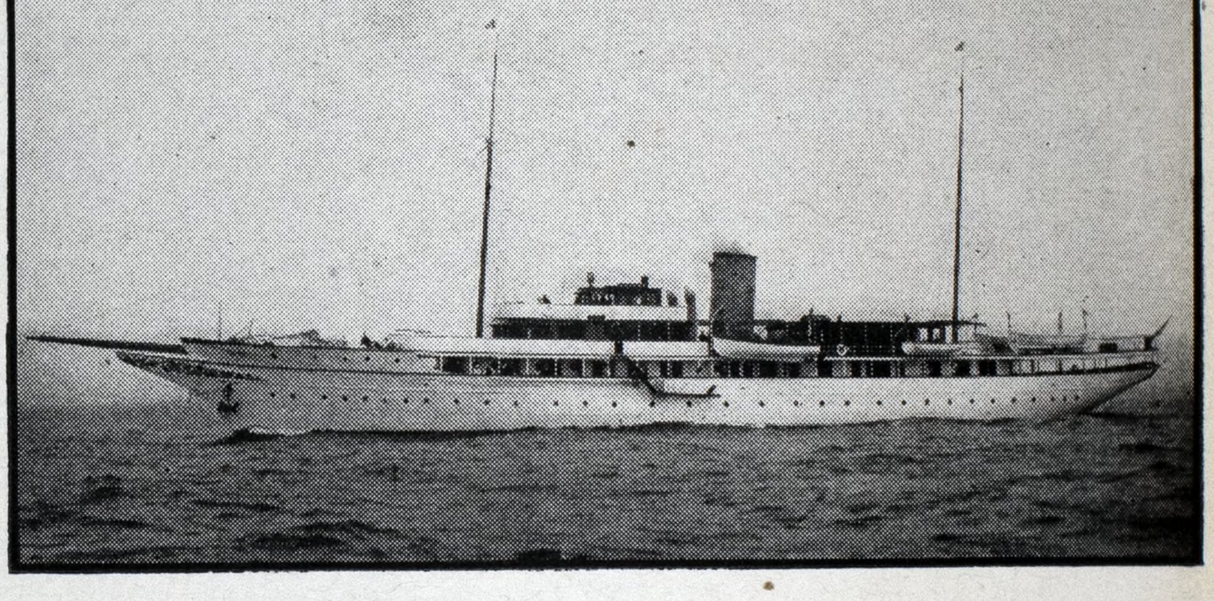
Photo Edwin Levick, New York

NOURMAHAL

Vincent Astor's *Nourmahal* (above), largest yacht previously built at Kiel. She is 263 feet long and of 1339 tons.

HI-ESMARO

Hi-Esmaro (below), H. E. Manville's palatial new motor yacht is the biggest American-built yacht. She is 267 feet in length with a displacement of 1250 tons.



Three largest private yachts lubricated with Gargoyle Marine Oils

Among the 65% of the world's Diesel-powered vessels lubricated with Gargoyle Marine Oils are numbered the majority of the most famous privately owned yachts.

The dependable performance and practical engine-room economy of these high-quality lubricants appeal alike to the commercial owner and the yachtsman. Experienced engineers have found through years of consistent use that Gargoyle Marine Oils:

furnish the best insurance against untimely breakdowns, costly repairs and inconvenience on cruise;

conserve horsepower;

increase cruising radius;

reduce fuel and oil consumption;

lengthen the life of propelling machinery.

Stocks of Gargoyle Marine Oils are maintained in more than 300 of the world's leading ports. You will find in every one of these ports a Vacuum Oil Company representative thoroughly acquainted with every type of marine engine, and ready at all times to offer expert aid in solving any lubricating problem.

New Diesel Booklet

Our authoritative new treatise, "Correct Lubrication—Motorships", covers lubrication requirements in every type of modern Diesel vessel. We will be glad to send you a copy free of charge. Address your request to the Vacuum Oil Company, Marine Sales Department *D-6*, 61 Broadway, New York City.

GARGOYLE

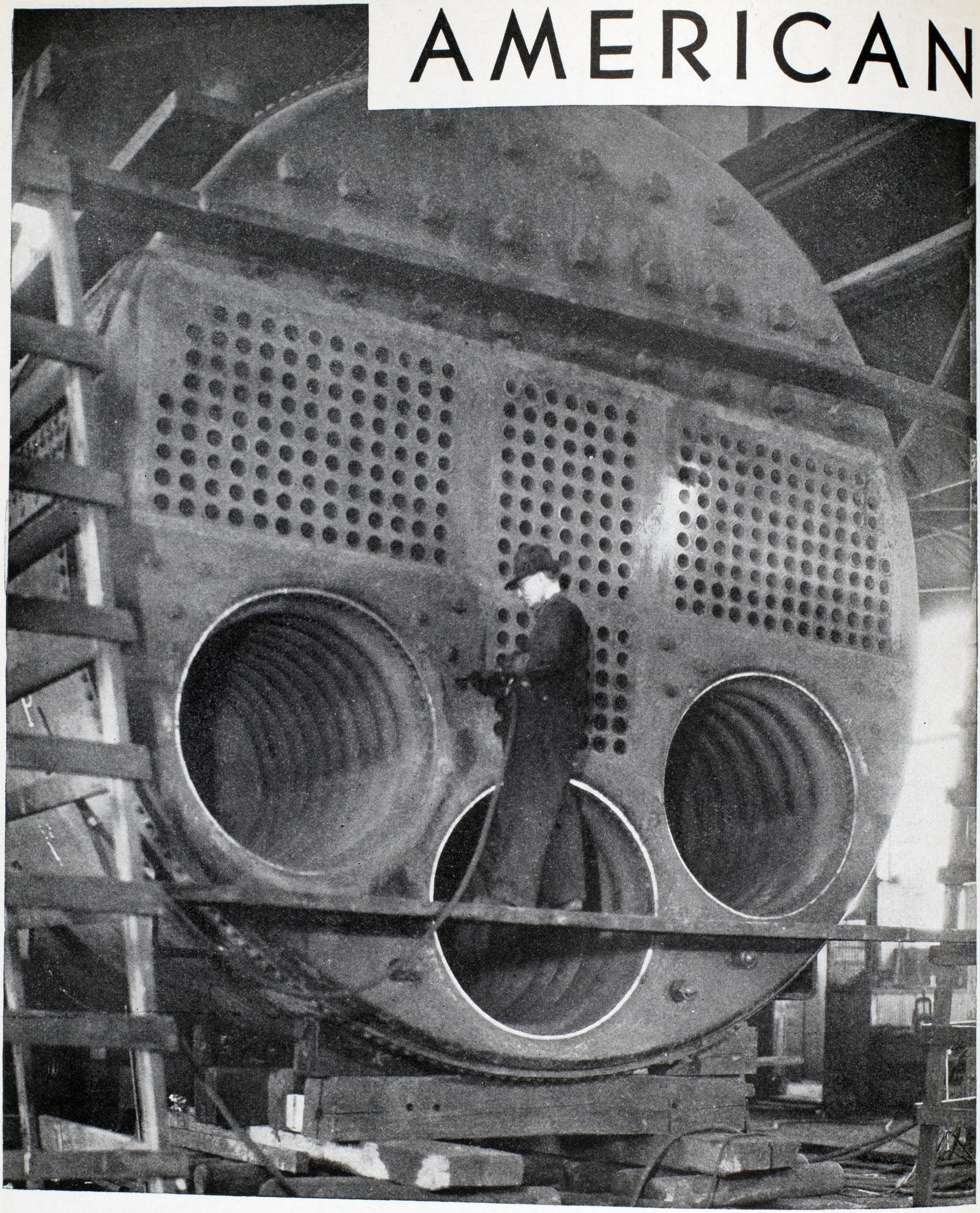
Marine Oils

a grade for each type of service

Vacuum Oil Company

Specialists in the manufacture of high-grade lubricants for every class of machinery Obtainable everywhere in the world

New York, U.S.A.



The AMERICAN

CLEVELAND
American Ship Building Co.

LORAIN
American Ship Building Co.

BUFFALO
Buffalo Dry Dock Company

SHIP *knows only one way to do a* DEPENDABLE JOB *and that is to do a* GOOD JOB

American Ship always does ship repair work in a way that costs the ship owners least in the long run.

American Ship knows only one way to do a *dependable* job and that is to do a *good* job.

Because for over thirty years this has been the basis of American Ship service to vessel owners and operators, there has grown up a spirit of deep trust and implicit confidence which expresses itself in the fact that more and more customers continue to send to American Ship not only their big jobs, but the minor jobs as well. They know that this utter *dependability* is their best investment.

And they are appreciative of the fact that this dependability prevails in every one of the American Ship Building Company's five strategically located ship yards.

Re-conditioning old boilers is one of American Ship's regular jobs.
We build new ones, too, in our large, well-equipped boiler shops.
But boiler shops are only a part of the complete modern facilities for building and repairing ships which enable us to deliver utterly dependable work, swiftly, all the time.

SHIP BUILDING CO

SOUTH CHICAGO
Chicago Ship Building Co.

SUPERIOR
Superior Shipbuilding Co.

Modern

BABCOCK & WILCOX
Marine Products

Water Tube Boilers
Superheaters
Air Preheaters
Economizers
Stokers
Fire Brick
Oil Burners
Oil Separators



One of the two Matson Navigation Company's 25,000 S.H.P. vessels being built for the San Francisco-Australian service. Those ships will operate with Modern Steam at 400 pounds pressure, 650° F. temperature. Babcock & Wilcox boilers will be used.

THE BABCOCK & WILCOX COMPANY

85 LIBERTY ST. NEW YORK, N. Y.

Steam

for today's economic needs

A few years ago the typical ship did all that was expected of her with cylindrical boilers, steam at 150 pounds pressure, and no superheat. The boiler efficiency was low and the water rate of the main engine was high; but coal was cheap, and steam consumption was not looked upon as anything of real importance.

Today the price of fuel, the cost of labor, and a long list of other items force the owner and operator to seek greater overall economy through the use of Modern Steam.

Modern Steam is no more like the steam of yesterday than the Santa Maria of 1492 was like the present Trans-Atlantic liner. Modern Steam is generated in an efficient boiler, at high pressure, and at high temperature. Efficient fuel burning methods and the use of more economical propulsion machinery are, of course, logical extensions of this idea.

Future advertisements of this series will give specific data on the greater efficiency of Modern Steam, its flexibility and reliability. They will show how the fuel consumption of actual marine installations has been reduced to .61 pounds per shaft horse power per hour for all purposes, how boiler efficiencies of 80 to 84% are realized, and how the modern steam principles can be applied to any ship, in many ways, and to any extent warranted by the investment required.

THE
BABCOCK & WILCOX
COMPANY

85 LIBERTY ST. NEW YORK, N. Y.

M3



BETHLEHEM PLATES

in *S. S. LEVIATHAN*

When America's largest vessel, the S. S. Leviathan, was recently docked for re-conditioning, it was of utmost importance that the plates necessary for the work be provided quickly. Bethlehem plates were used, the Bethlehem mills meeting the demands for quick service and superior product.

Bethlehem specializes in the manufacture of plates for passenger and cargo vessels, tankers, barges, yachts and every other class of hull construction, as well as in plates and plate products used in the construction of marine boilers.

BETHLEHEM STEEL COMPANY *General Offices:* **Bethlehem, Pa.**

District Offices: **New York, Boston, Philadelphia, Baltimore, Washington, Atlanta, Buffalo, Pittsburgh, Cleveland, Cincinnati, Detroit, Chicago, St. Louis.**

Pacific Coast Distributor: **Pacific Coast Steel Corporation, San Francisco, Los Angeles, Seattle, Portland, Honolulu.**

Export Distributor: **Bethlehem Steel Export Corporation, 25 Broadway, New York City.**

BETHLEHEM STEEL PLATES

"LEBANON" RIVETS

Made of Genuine Puddled

WROUGHT IRON

If you would have less repairs in dry dock, less frequent re-riveting jobs, specify "Lebanon" Rivets.

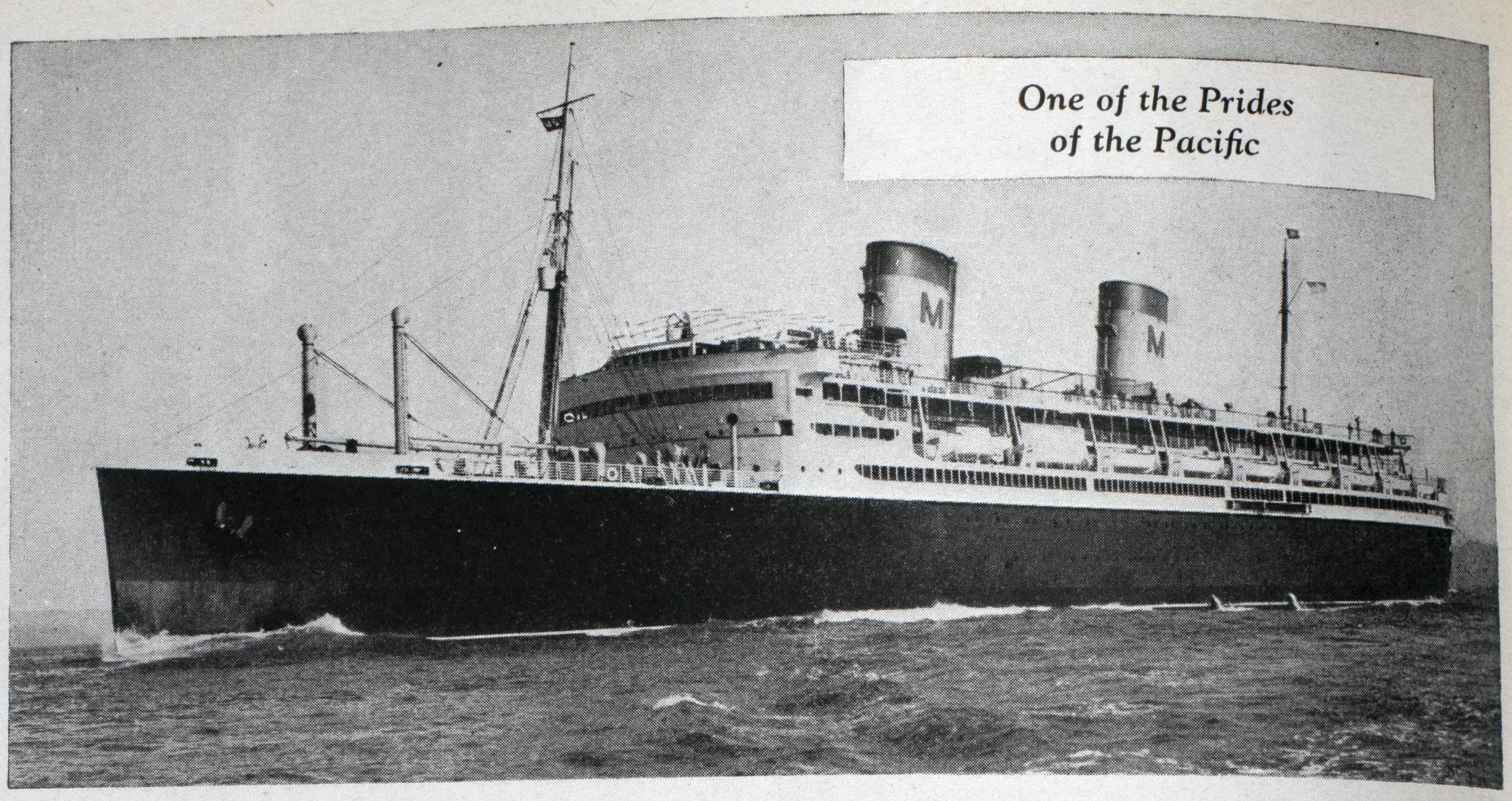
They can be depended upon to effect real economies in maintenance costs below the water-line, and meet Lloyds and American Bureau Classifications *unconditionally.*

Send for Samples, and Prices

Wrought Iron Company of America

General Offices: Lebanon, Pa.
Works: Lebanon and Scranton, also Rome, N. Y.
SALES OFFICES:
Phila., Commercial Trust Co. Bldg.
Richmond, Va. Mobile, Ala.
Boston: 161 Devonshire Street
NEW YORK: 393 Seventh Ave. Phone Penn. 5919.





S. S. MALOLA

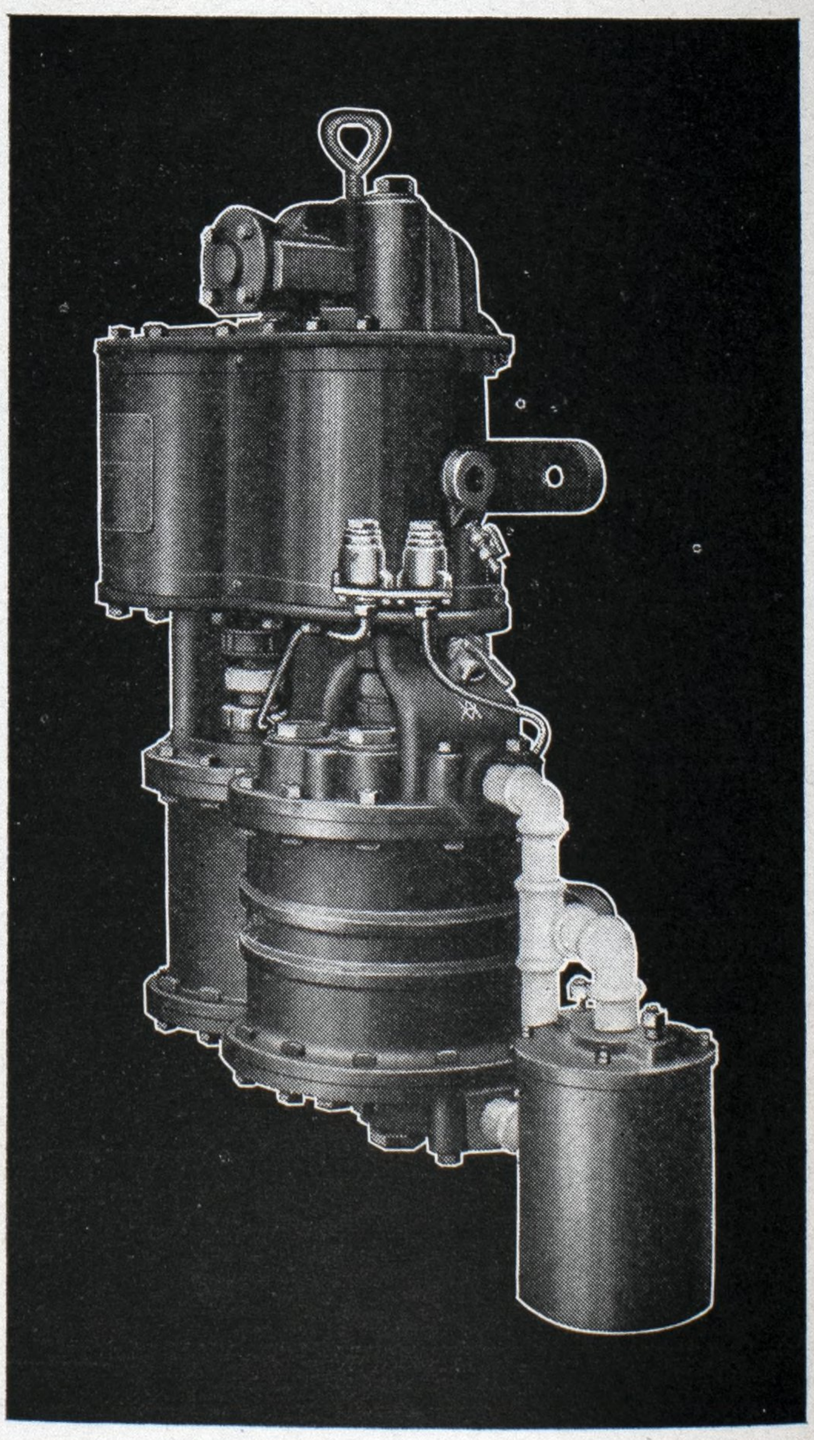
and 16 other

Matson Line Boats use WESTINGHOUSE Air Compressors

Compressed air is now being put to many uses aboard ship . . . removing scale and rust . . . cleaning flues and machinery . . . blowing alarm whistles . . . operating pneumatic tools for making emergency repairs . . . and starting Diesel engines.

Westinghouse-National Compressors have been installed on the entire fleet of many steamship lines such as . . . Export . . . A. H. Bull . . . Dollar . . . Isthmian . . . Lukenbach . . . Consolidated . . . United States Lines . . . and Matson.

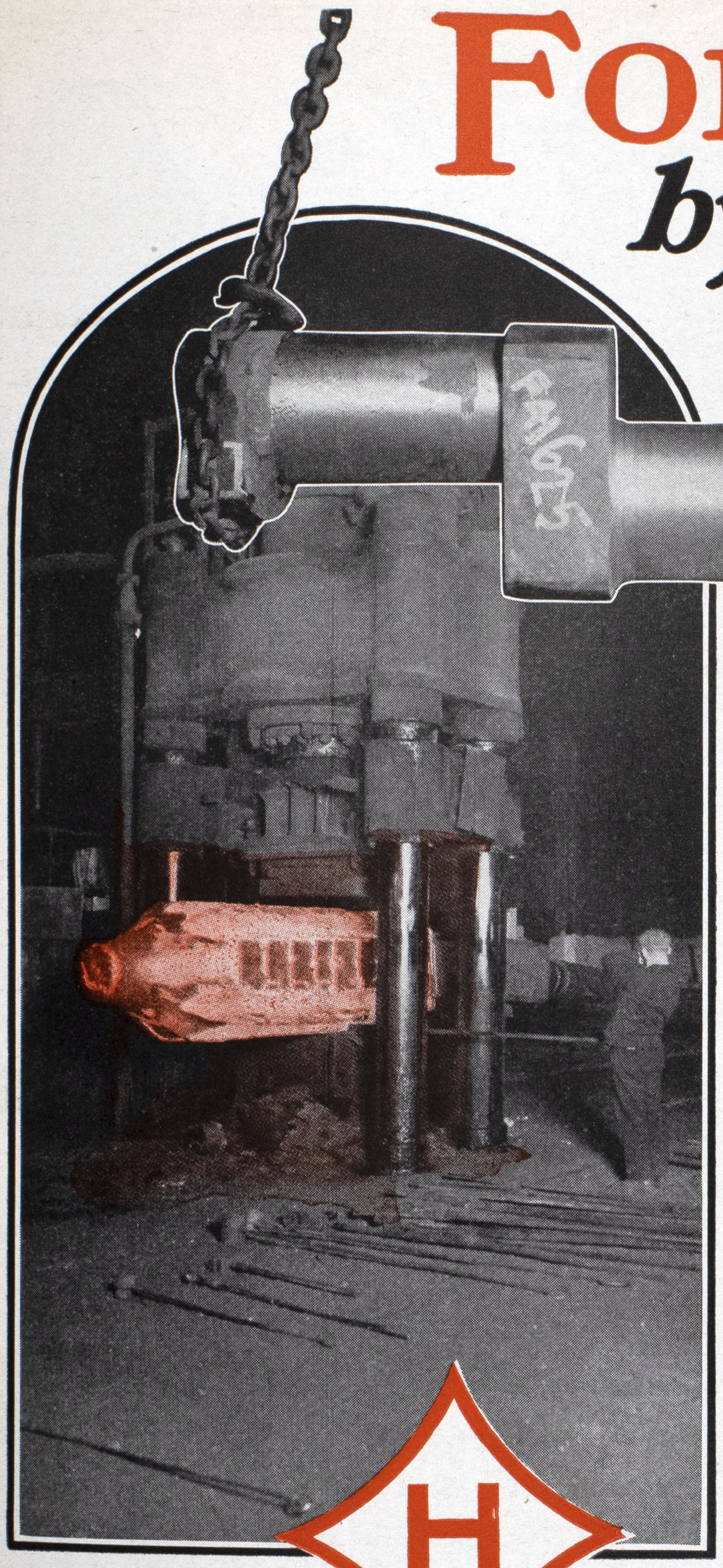
The type most generally used is steam-driven, as shown. Where electric current is available the motor-driven type—in sizes from 3 to 700 cu. ft.—is often preferred.



WESTINGHOUSE TRACTION BRAKE CO.
General Office and Works ◆ WILMERDING, PA.

WESTINGHOUSE—NATIONAL
Air Compressors
"QUALITY MACHINES FOR QUALITY SERVICE"

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by Heppenstall



THE hundreds of customers who now specify Heppenstall forgings are familiar with the dependability of Heppenstall service.

To thousands of other purchasers of forgings, manufacturers demanding meticulous combinations of alloys, honest workmanship, experienced heat treating and the facilities of a modern plant in which production is controlled under one roof from pig iron to rough machine forgings — ***Heppenstall service*** is offered.

Experienced metallurgists and laboratory experts are at your command. Skilled engineers will confer with you on specifications. The entire service will culminate in products presenting full and complete satisfaction.

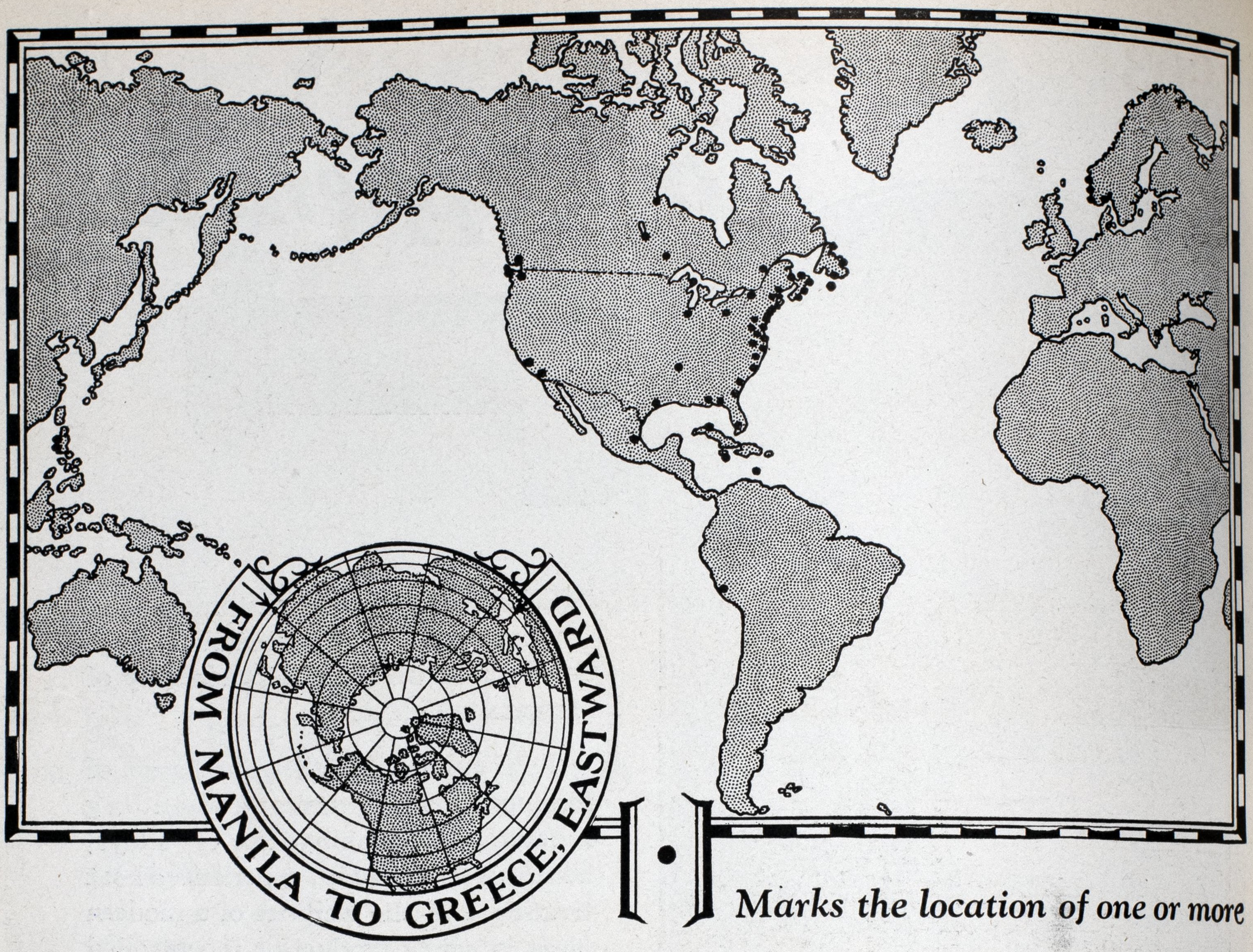
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PLANNED in Cambridge: erected thousands of miles away. Whether the work is in a crowded harbor or at the very outposts of civilization: no matter what difficulties are presented: Crandall Engineering will see it through—*on time.*

This map shows the record of 76 years specializing in the construction of these water frontage facilities. For four generations Crandall Engineers have erected drydocks of railway and floating types. Their experience includes every type of work from simple yacht yard railways to complete submarine bases. And their service embraces every step from the initial survey to the final painting. Their organization and equipment assures successful operation in any part of the world.

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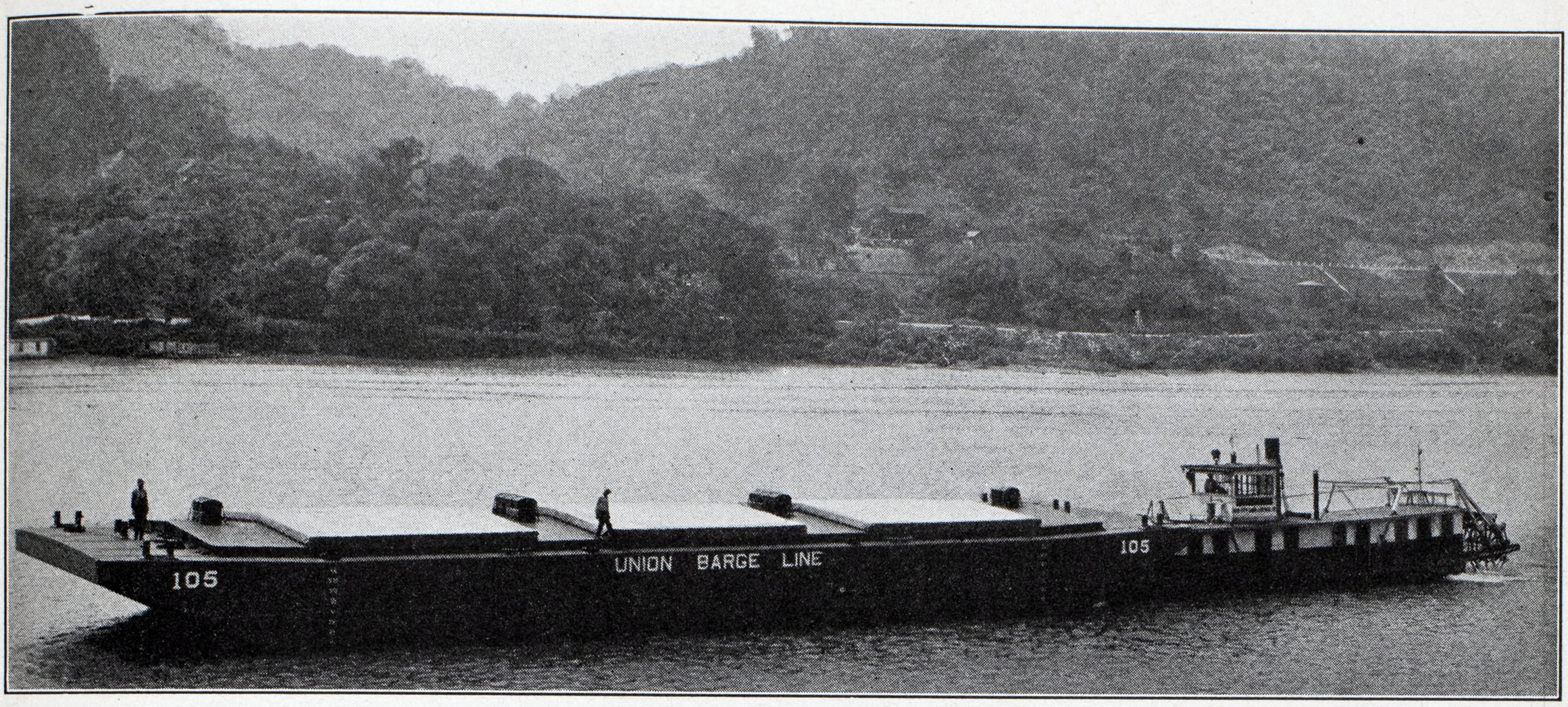
THE CRANDALL ENGINEERING CO.

Cambridge, Massachusetts

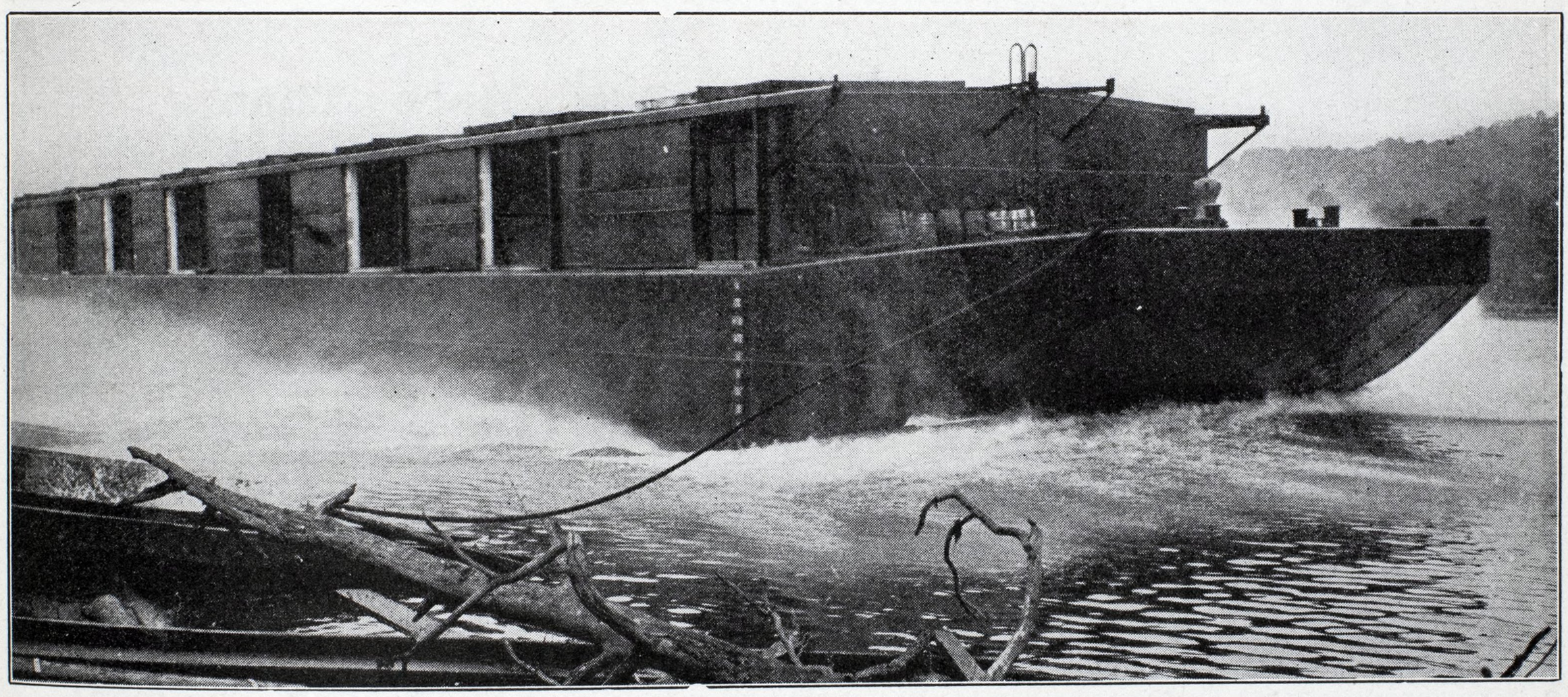
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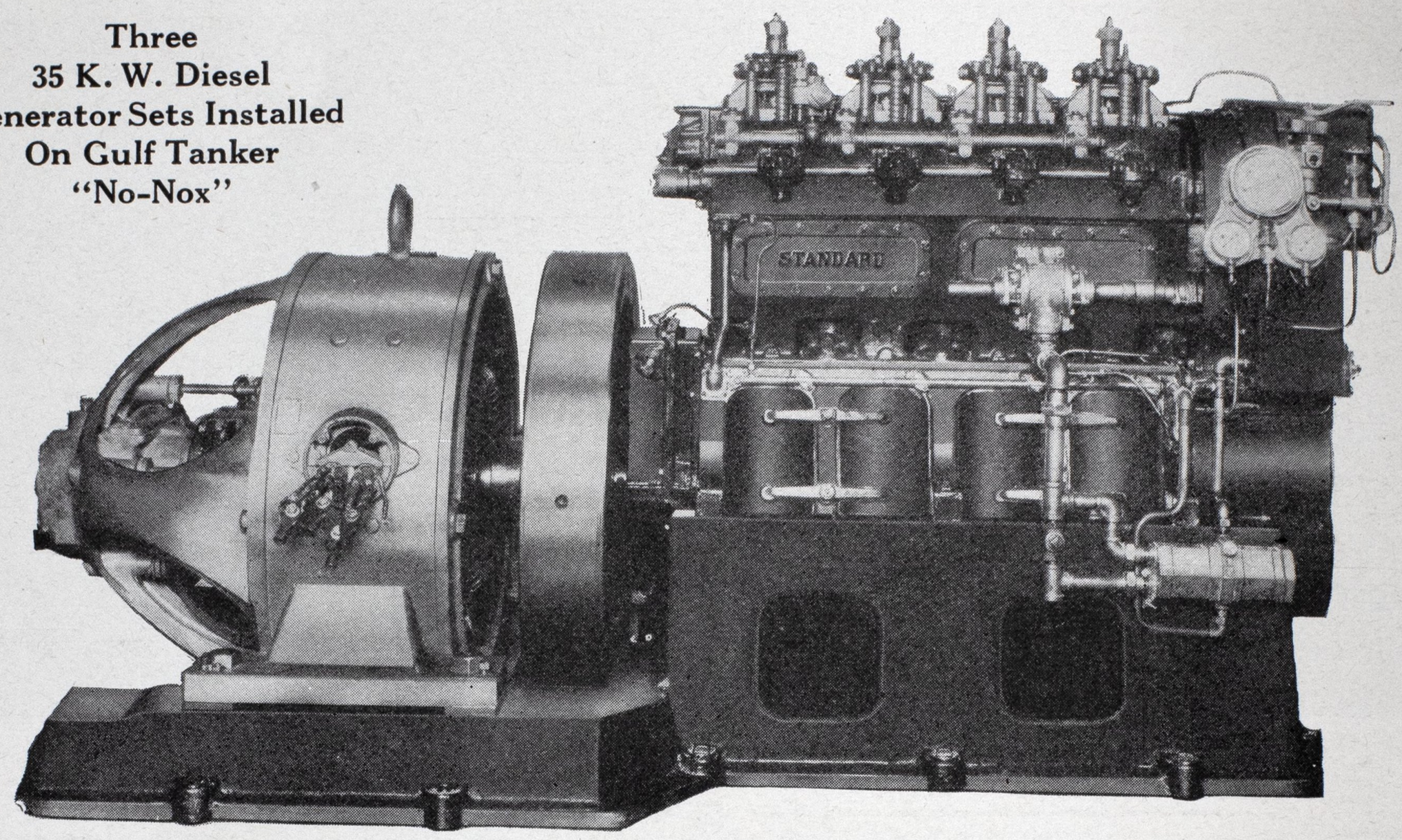
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STANDARD DIESEL GENERATORS



The I-R Condenser Goes to Sea

I-R Equipment on the Santa Clara

2 Main Condensers

2 Auxiliary Condensers

2 Main Condenser Circulating Pumps

2 Auxiliary Condenser Circulating Pumps

3 Main Condensate Pumps

4 Auxiliary Condensate Pumps

2 Sanitary Pumps

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Two-stage Steam Jet Vacuum Pumps

THE race for marine supremacy has been responsible for great strides in engine room design. The last decade has witnessed the introduction of the high-efficiency steam plant for marine propulsion; and now the I-R condenser takes its place as an integral part of these modern plants.

The Grace Line S. S. Santa Clara, which recently completed her first sea trials, is equipped with I-R surface condensers. In design they are similar to the I-R condensers which have earned an enviable reputation for sustained high efficiency in central station service.

The I-R patented design has made possible a reduction in the amount of condensing surface, making for greater reliability and reduced maintenance expense. This has resulted in other improvements, such as a reduction in weight and overall dimensions. Considered from every viewpoint, these condensers are particularly fitted for marine applications of the most advanced type.

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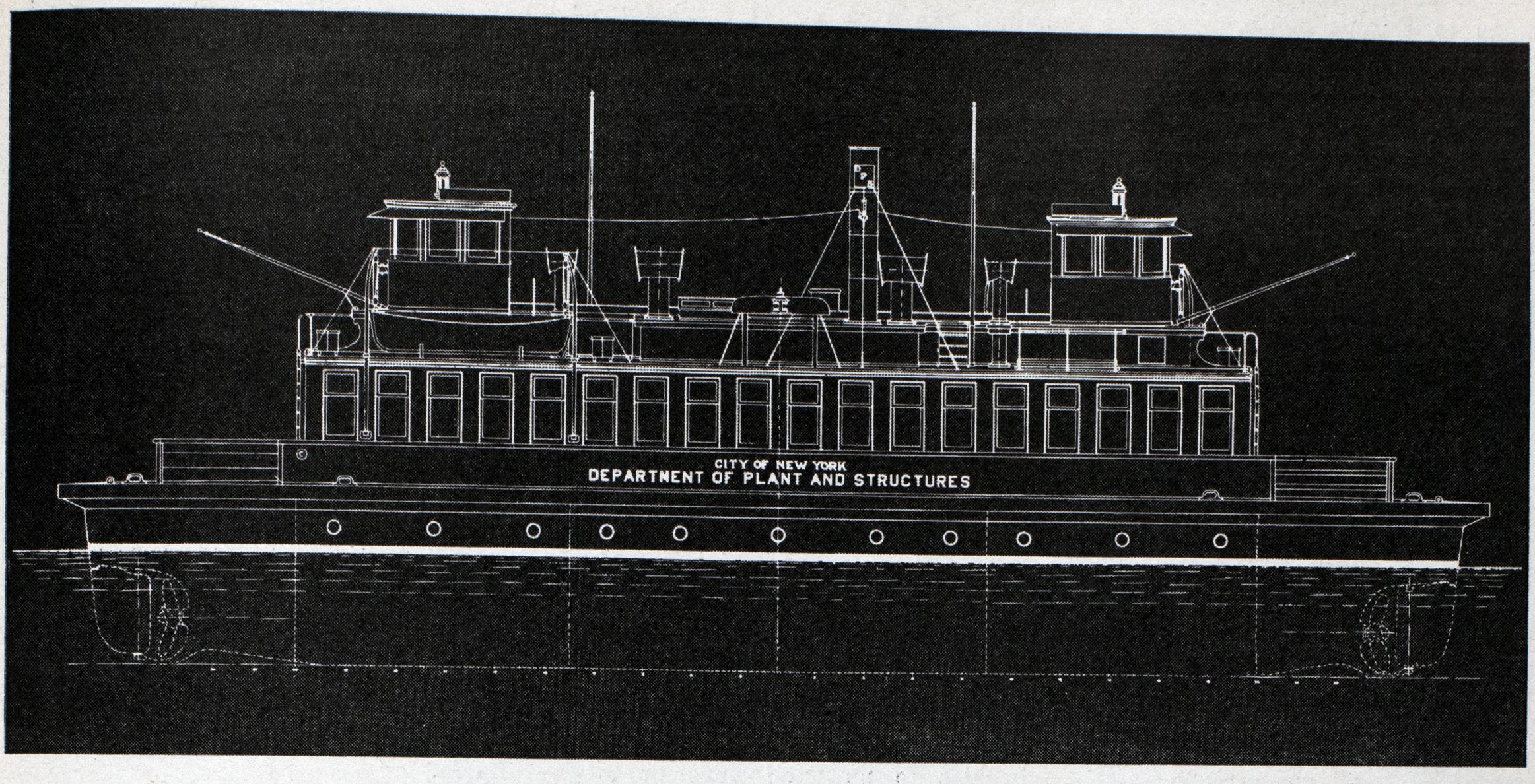
Engine Works Equipped For General Heavy Machine and Foundry Work

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Complete Shipbuilding Dry Dock and Repair Facilities

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New Diesel ferry "Chelsea," designed by Mr. R. W. Morrill, Naval Constructor, and Mr. Calvin Crocker, Chief Engineer of the Department of Plant & Structures.



The City of New York chooses Nelseco again

NELSECO DIESELS have proved their worth to the City of New York. The satisfactory service given by Nelseco installations in the ferries, *Greenwich Village* and *Mott Haven*, has resulted in the selection of the same make of Diesel engines for a sister ship, now under construction, scheduled to be launched early in June.

The new boat is 101 ft. 6 in. long, 30 ft. in beam, and 12 ft. deep. It has accommodations for seven vehicles and seventy-four passengers. It has been built with remarkable speed. The order was placed in February, with The Todd Shipyards Corporation of Brooklyn. When launched, in June, it will be completely equipped, ready for trial trip and delivery. None of the usual delays will attend installation of engines and other mechanical equipment.

The new boat differs from its sister ships in that it has a Diesel-electric installation, instead of the direct Diesel drive of its predecessors. Prime movers of the new power plant are two 200 B.H.P. Nelseco Diesels, each driving a 125 K.W., 250 V. Electro-Dynamic generator and a 15 K.W., 125 V. exciter operating at 300 R.P.M. The propelling motor is rated at 300 B.H.P., 500 V. at 250 R.P.M.

Nelseco Diesels of 1930 represent the finest marine-engineering practice. Their economy, reliability and long life are unquestioned. The range of Nelseco Diesel engines includes models for tow-boats, yachts, passenger, freight and fishing vessels of all types. We shall be glad to send you complete information. Write for Catalog MR.

ELECTRIC BOAT COMPANY

NEW LONDON SHIP AND ENGINE WORKS, GROTON, CONN., U. S. A.

Original licensees from and collaborators with M. A. N. since 1910

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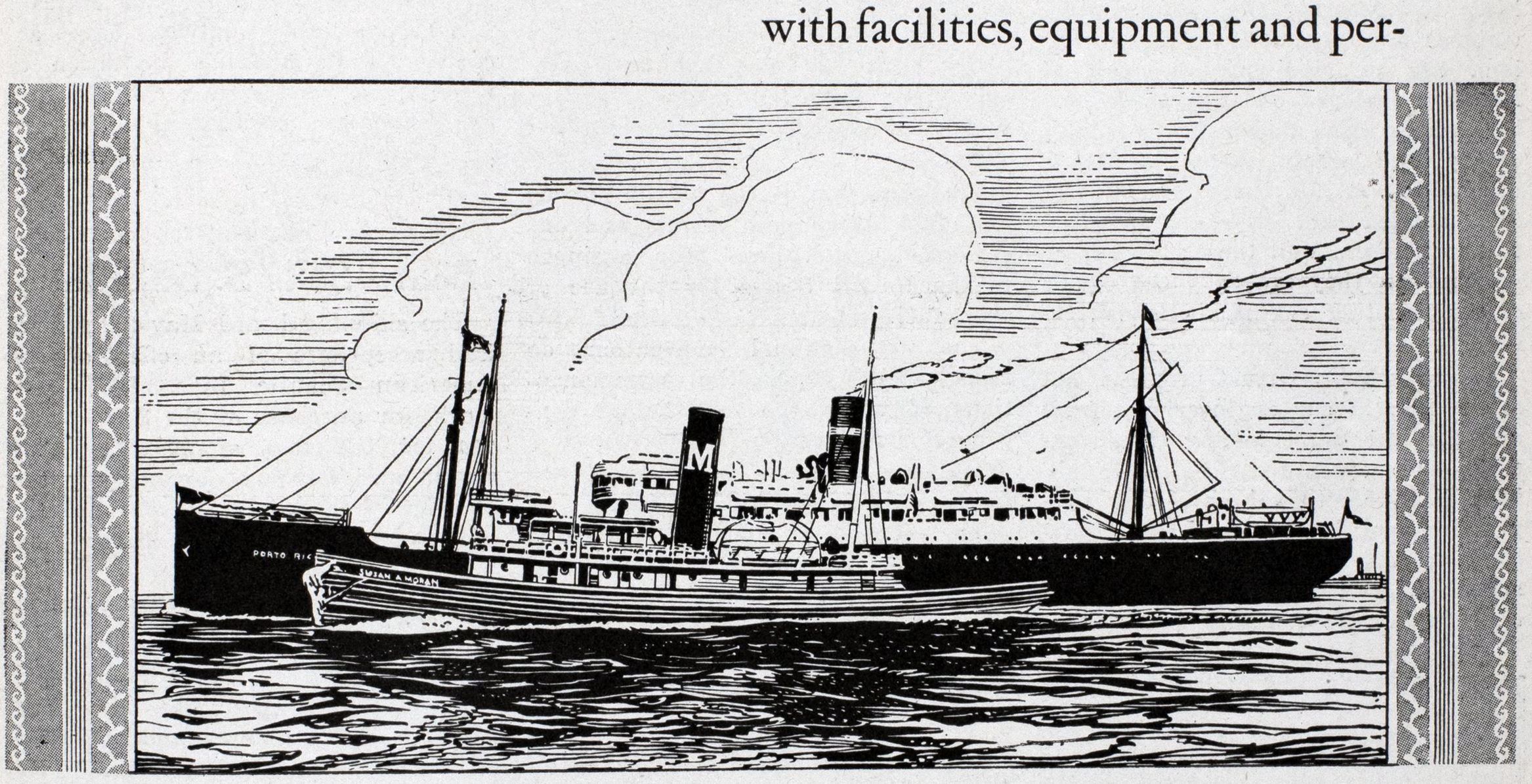
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OWNERS and operators using Moran Service find *more* than an efficient Docking Service.

In engaging Moran they add an effective operating Service which becomes an actual department of their own organizations; cooperative to the highest degree and with facilities, equipment and personnel that insures the widest experience and greatest dependability.



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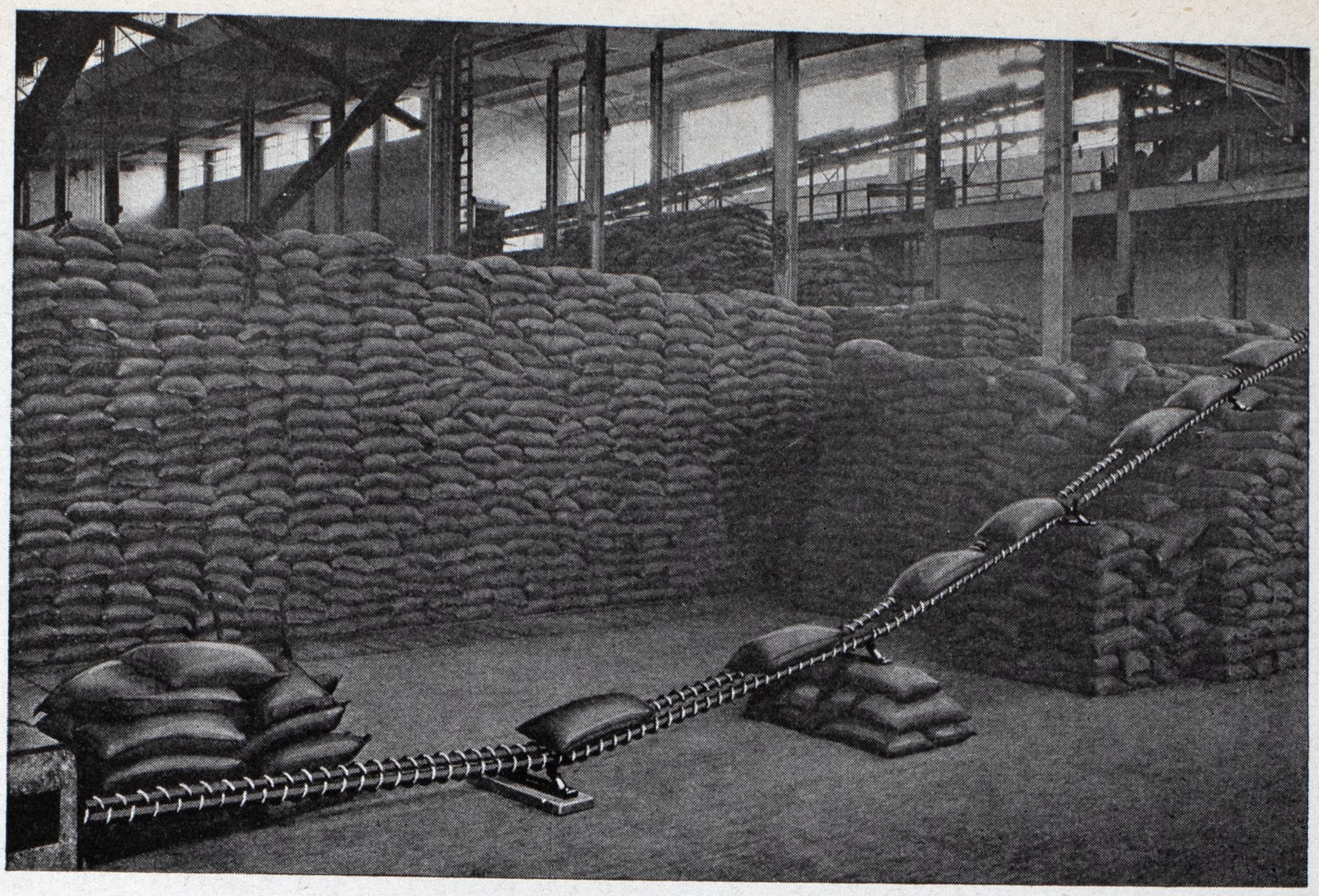
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MORAN TOWING AND TRANSPORTATION COMPANY, INC.

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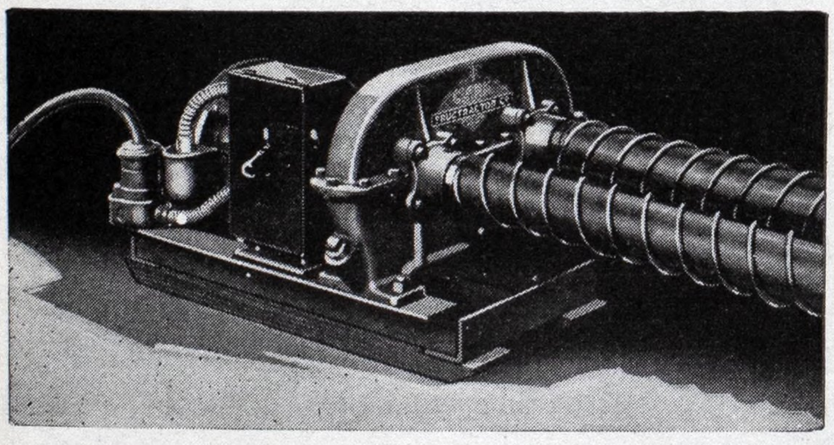
MORAN Service



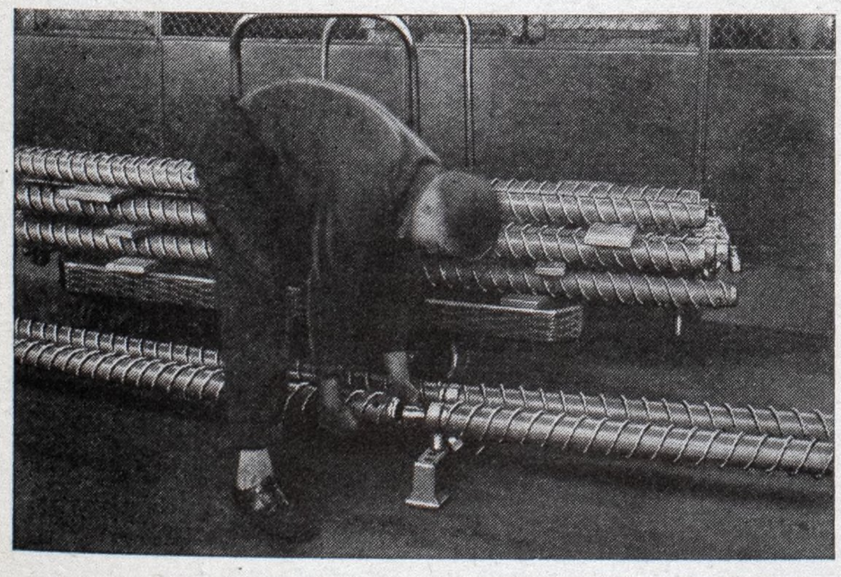
Clark "TwinVeyor" carries bagged sugar up a 30% grade, 90 ft. per min., 1800 bags per hr.

announcing CLARK TWINVEYOR

a flexible, portable, power conveyor



Power head is supplied with current through extension cord. Flow of power is constant along entire assembly.



Assembled or disassembled in one minute per 8-ft. dual section. Each section joins with automatic lock.

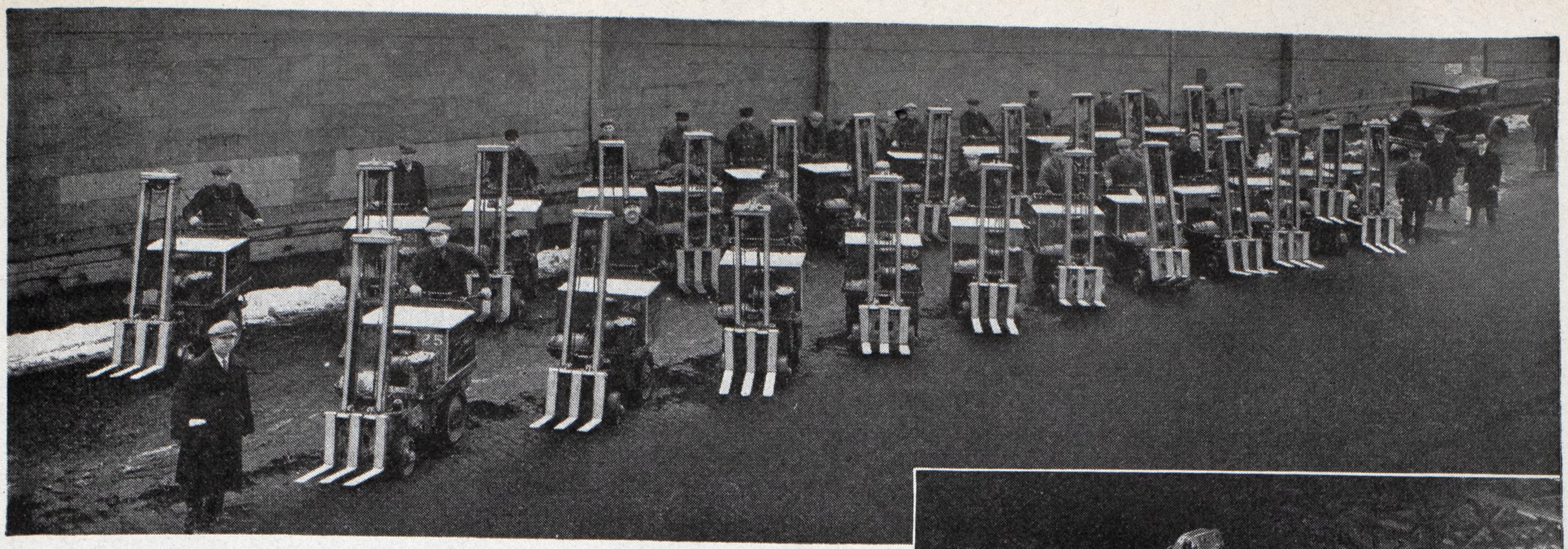
A better, quicker, cheaper way to handle materials in bags, bales, crates, bundles, boxes. It consists of two external spiral tubes that are turned toward each other by a power head.

Light enough to be easily moved about by one man. Strong enough to carry heavy loads. A standard unit comprises six 8-ft. dual sections and the power head. Any joint will take a 15° angle, horizontal or vertical. This means flexibility of use—the outfit conveys, elevates, tiers—fast, economical and smooth in operation.

Clark "TwinVeyor" is offered to industry in general only after years of actual service in the largest sugar refinery in the world. Its record of performance is remarkable. It will cut cargo-handling costs.

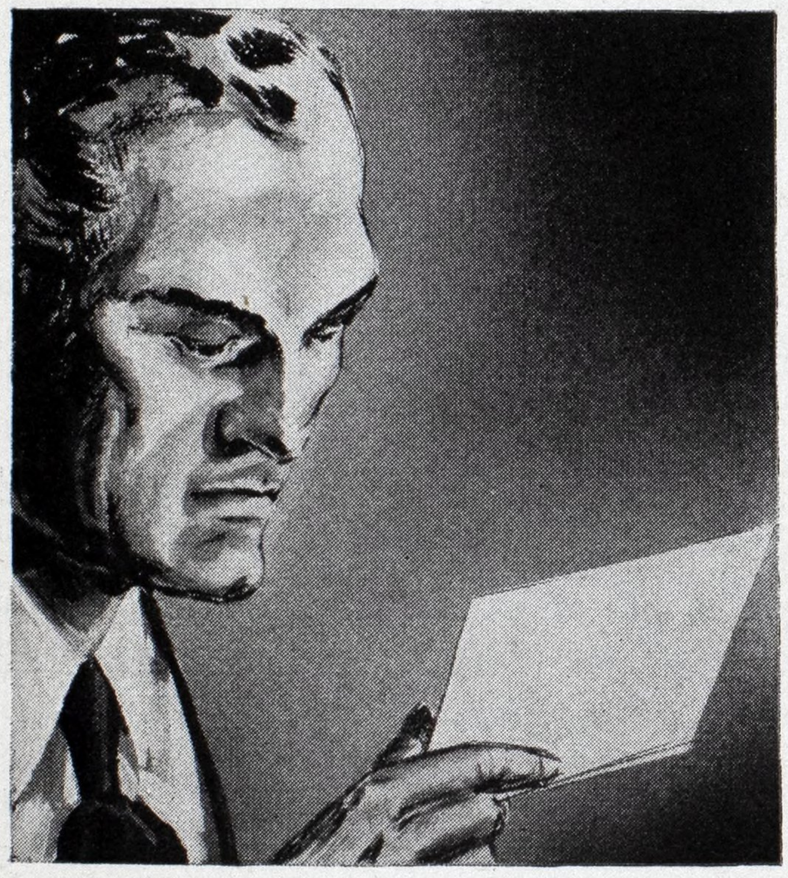
Mention this advertisement in your inquiry

The Clark Tructractor Co.
Battle Creek, Michigan





REDUCING NUMBER OF HANDLINGS CUTS COST OF HANDLING MARINE FREIGHT



The marine terminal operator who closely examines suggested plans for greater economy in freight handling will find that each plan is founded on this basic principle:

> "Reducing number of handlings saves entire cost of each handling eliminated and tends to reduce the cost of the remaining handlings."

In other words, the secret of lower handling costs lies in reducing the number of times freight must be handled while moving through the warehouse. In scores of terminals electric trucks have proved the most economical and efficient method of reducing the number of handlings.

At one terminal, a fleet of 24 Elwell-Parker electric Tructors returned its entire cost during the first 100 days it was in operation. Annual savings amounted to approximately $270,000. Usually the purchase of one Elwell-Parker Tructor for marine freight handling leads to another . . . and another. Confidence and enthusiasm of the user increases with each installation.

Practically every Elwell-Parker Tructor of which we have a record has paid for itself in less than one year.

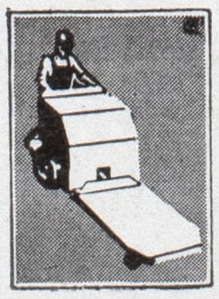
Resolve now to get the complete facts on this labor saving . . . cost saving system of handling freight. Your nearest Elwell-Parker Engineer will be glad to talk with you and give you the full story. Call him — or write direct to Elwell-Parker in Cleveland.

Oversize motors, heavy in copper, take all the power the battery delivers. No fuses are necessary. Power failure at crucial moments is avoided. This, together with automatic control features protecting operator and truck, will interest your Safety Committee.

The Elwell·Parker Electric Co.

Designers and Builders of Electric Industrial Trucks, Tractors and Cranes for 24 years

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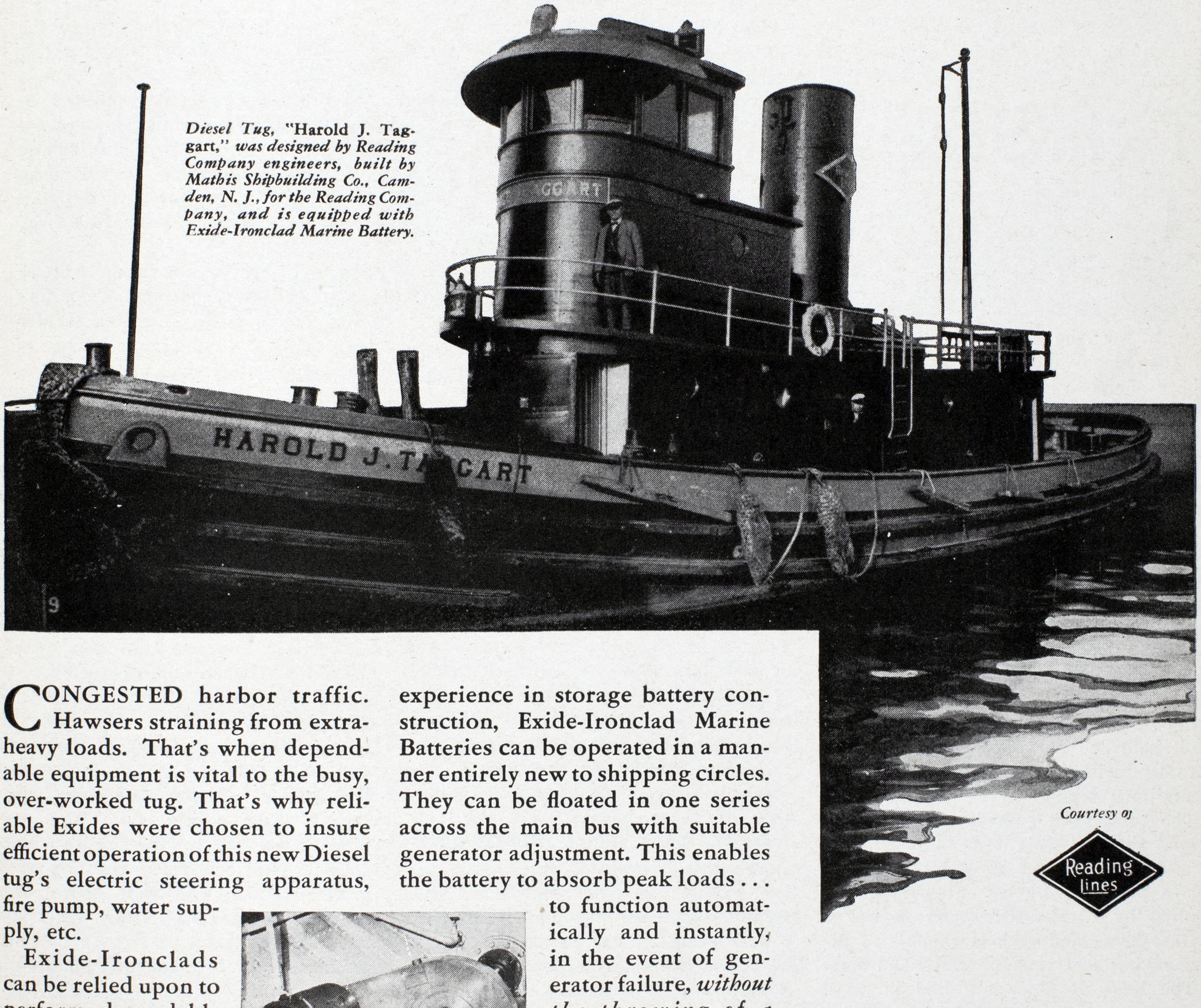


4200 St. Clair Avenue, Cleveland, Ohio

Tructors

On watch . . . below decks

Reliable Exide-Ironclad Marine Batteries are always on the job to fill electrical requirements of this sturdy Diesel tug

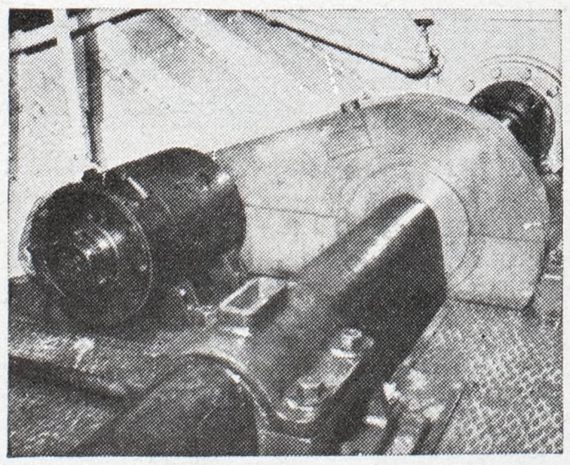


Diesel Tug, "Harold J. Taggart," *was designed by Reading Company engineers, built by Mathis Shipbuilding Co., Camden, N. J., for the Reading Company, and is equipped with Exide-Ironclad Marine Battery.*

CONGESTED harbor traffic. Hawsers straining from extra-heavy loads. That's when dependable equipment is vital to the busy, over-worked tug. That's why reliable Exides were chosen to insure efficient operation of this new Diesel tug's electric steering apparatus, fire pump, water supply, etc.

Exide-Ironclads can be relied upon to perform dependably under any weather conditions . . . to furnish ample standby power for lighting, radio, deck auxiliaries, and pumps.

Designed by specialists with 42 years' experience in storage battery construction, Exide-Ironclad Marine Batteries can be operated in a manner entirely new to shipping circles. They can be floated in one series across the main bus with suitable generator adjustment. This enables the battery to absorb peak loads . . . to function automatically and instantly, in the event of generator failure, *without the throwing of a switch!* And the unique positive plates, composed of finely slotted tubes of hard rubber, retain active material, insuring long, reliable battery life. Write for information.



No auxiliary engine needed to keep battery in charged condition. Small waterproof generator at left operates from enclosed chain drive directly from main engine shaft, as shown in picture.

Courtesy of

Reading Lines

Exide

IRONCLAD

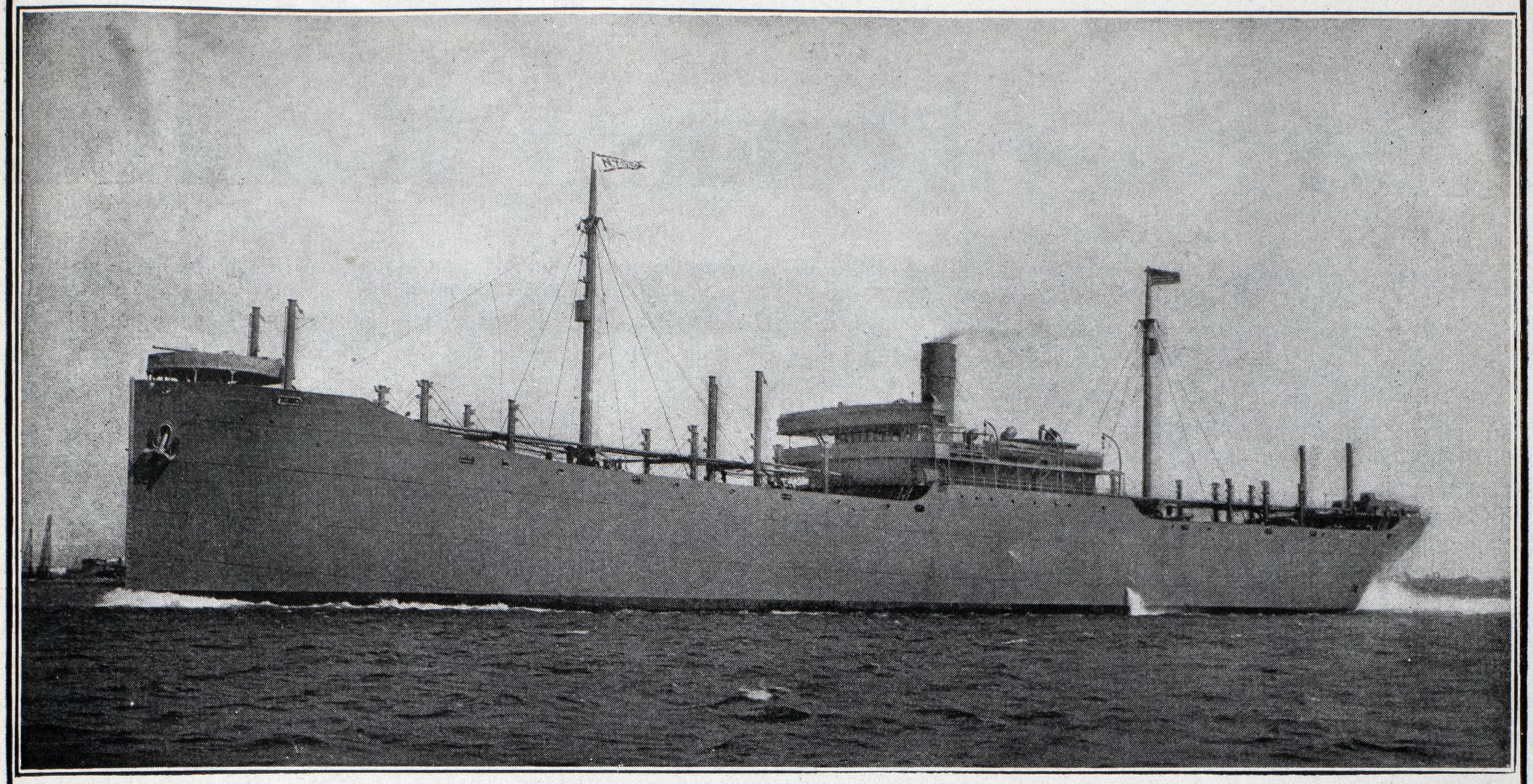
MARINE BATTERIES

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia

THE WORLD'S LARGEST MANUFACTURERS OF STORAGE BATTERIES FOR EVERY PURPOSE

Exide Batteries of Canada, Limited, Toronto

BUILT BY NEW YORK SHIPBUILDING COMPANY



S. S. DEEPWATER

Length 454 ft.; beam 64 ft.; depth 37 ft.; 12,420 deadweight tons. 3,100 H. P.

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built by

NEW YORK SHIPBUILDING COMPANY

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S.S. Transportation	Coastwise Transportation Co.
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S.S. Middlesex	Coastwise Transportation Co.
S.S. Norfolk	Coastwise Transportation Co.
S.S. Hampden	Coastwise Transportation Co.
S.S. Franklin	Coastwise Transportation Co.
S.S. Plymouth	Coastwise Transportation Co.
S.S. Virginia	Pocahontas S. S. Co.
S.S. Jonancy	Pocahontas S. S. Co.
S.S. Bylayl	Pocahontas S. S. Co.

Name	*Built for*
S.S. Bristol	Coastwise Transportation Co.
S.S. Deepwater	Darrow-Mann Co.
S.S. Tidewater	Darrow-Mann Co.
S.S. Fairmount	Coastwise Transportation Co.
S.S. Freeman	Pocahontas S. S. Co.
S.S. Sewall's Point	Darrow-Mann Co.
S.S. Glen White	Darrow-Mann Co.
S.S. Winding Gulf	Darrow-Mann Co.
S.S. Wm. N. Page	Darrow-Mann Co.
S.S. Absecon	Emergency Fleet Corp.
S.S. Tuckahoe	Emergency Fleet Corp.

In addition, the yard has built 18 Coal Barges, totaling 32,227 deadweight tons.

NEW YORK SHIPBUILDING CO.

Main Office and Works: Camden, New Jersey **New York Office: 420 Lexington Ave.**

EVIDENCE

This SOFT-RUBBER BEARING

MARINE engineers—and mechanical engineers—who keep up with the rapid developments in their profession, have been repeatedly astonished by this B. F. Goodrich development—a bearing made of *rubber* and *lubricated* with *water*.

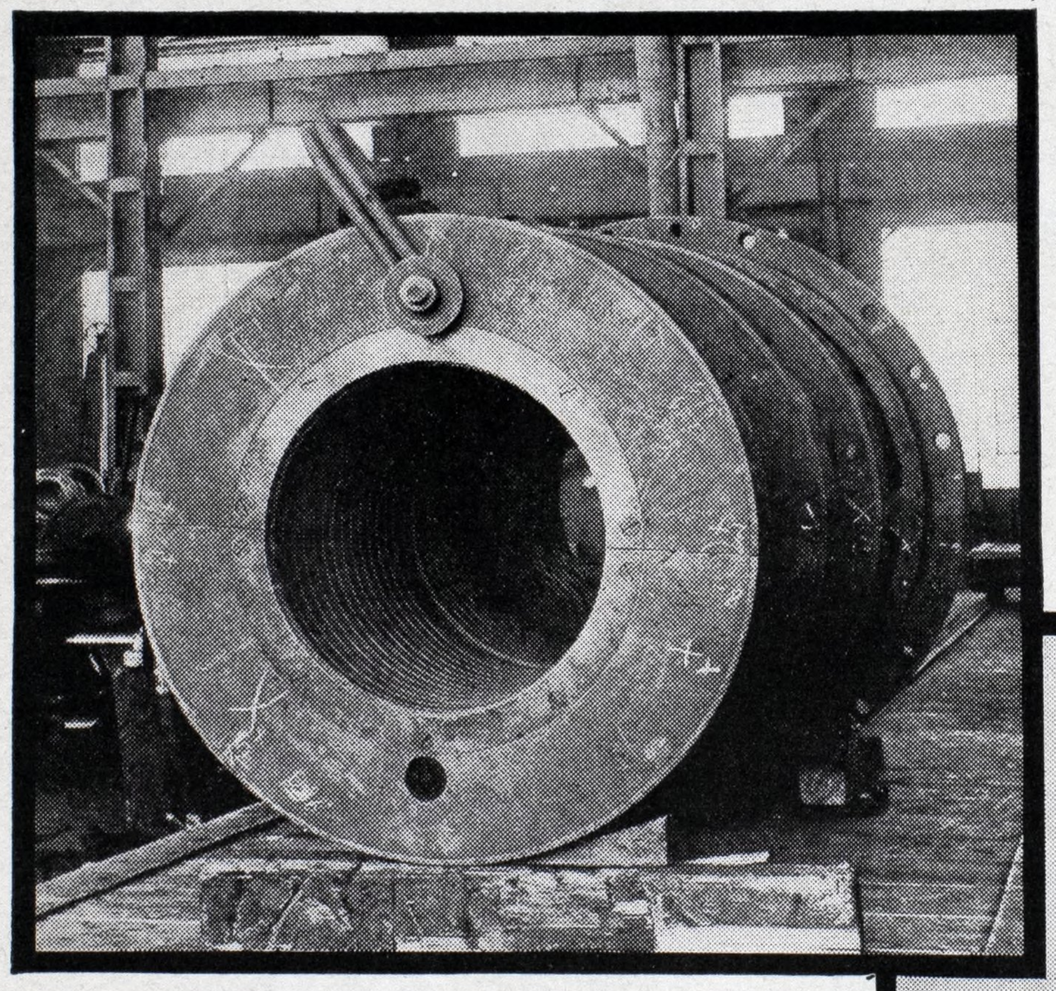
For years these engineers have been faced with a basic inadequacy in the materials they had to use, wherever a bearing operated in water. Many complicated devices were attempted, to exclude water and foreign matter and to obtain an oil-lubricated bearing. In the larger ships the nearest thing to a solution was lignum-vitae; this gave a trouble-free bearing for a limited length of time, but at the expense of a scored shaft liner, frequent and costly bearing renewal and annoying vibration.

Rubber, at first, would seem inadequate for such strenuous service. Yet rubber stands up under terrific strain as a tire tread, while metal chains are ground through in a few hundred miles. The co-efficient of *wet* rubber in contact with metal *(as a tire on a wet street-car track)* is known to be very low.

Goodrich engineers had developed a rubber with amazing resistance to abrasive wear. So they designed the Goodrich "Cutless" bearing. Today these bearings are in use on craft of every type, in hydraulic turbines, centrifugal pumps, on suction dredges—literally in every service where oil lubrication is difficult, or where sand and grit cut the ordinary bearing.

Especially in sandy or dirty water, records have been made where Goodrich bearings have outworn previous installations of lignum-vitae as much as nine or ten times.

Would you like to have further information about Goodrich bearings? Write to the B. F. Goodrich Rubber Co. *(Est. 1870)* Akron, Ohio.



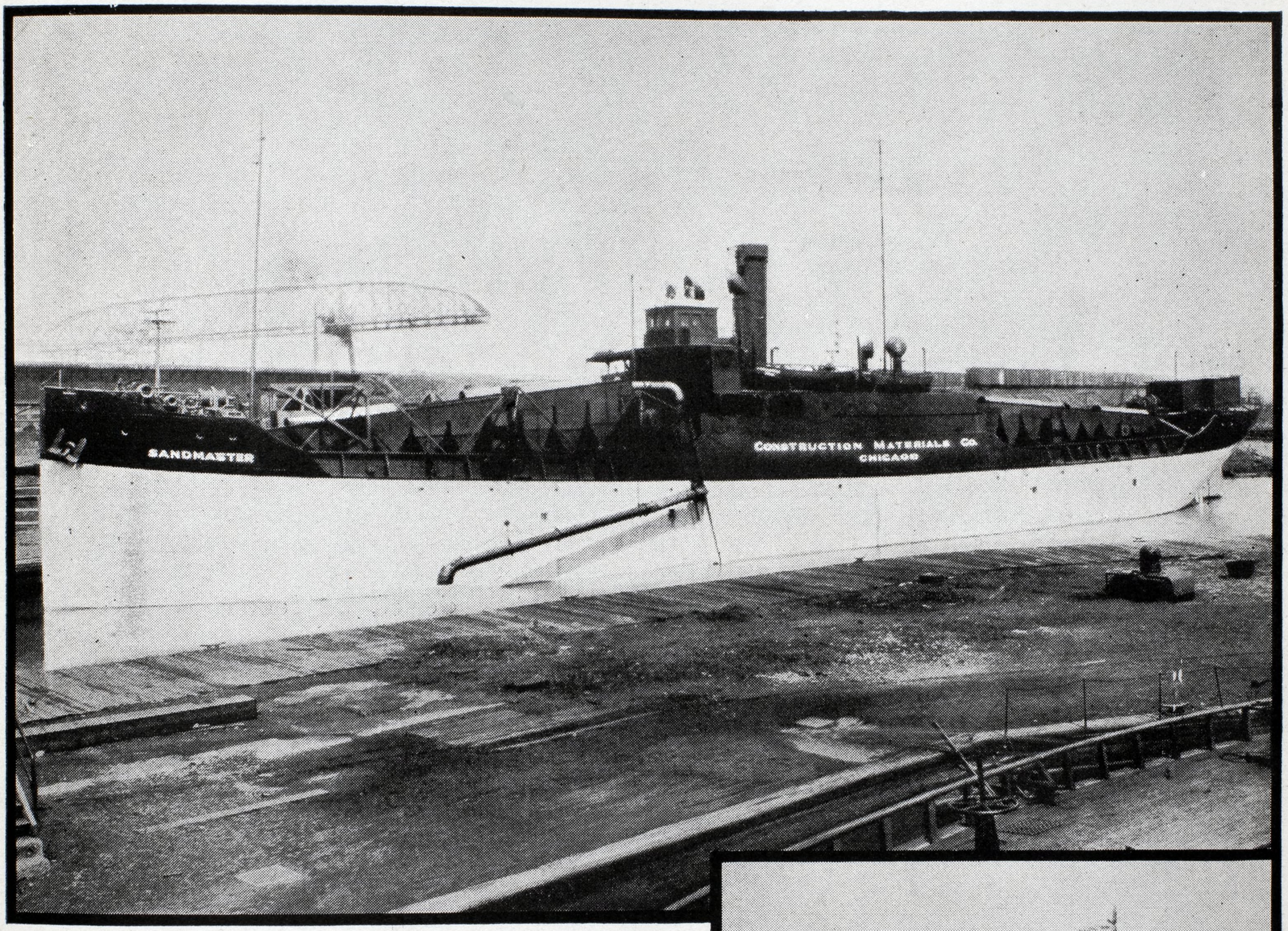
NO WEAR after THREE YEARS' night-and-day service. Photo shows 24" *(inside diam.)* Goodrich spiral-type bearing installed in 16,500 H.P. turbine of the Pennsylvania Water & Power Co., Holtwood, Pa., December 13, 1925. At the end of three years, careful measurements showed *no wear* whatever. It has been in continuous service ever since. The life of bearings previously used *(lignum-vitae)* averaged only 13 to 15 months.



GOODRICH BEARINGS are particularly advantageous in the shallow-draft boats, operating in the rivers, lakes and canals. Photo shows one of the recent vessels to be equipped with these bearings—the Empire State, 254-foot Diesel freight vessel operating between Great Lakes ports and New York City. Owned by the Federal Motorship Corp., Buffalo. Built by the St. Lawrence Marine Dock Corp., Ogdensburg, N. Y.

PILES UP:

outwears every other type!



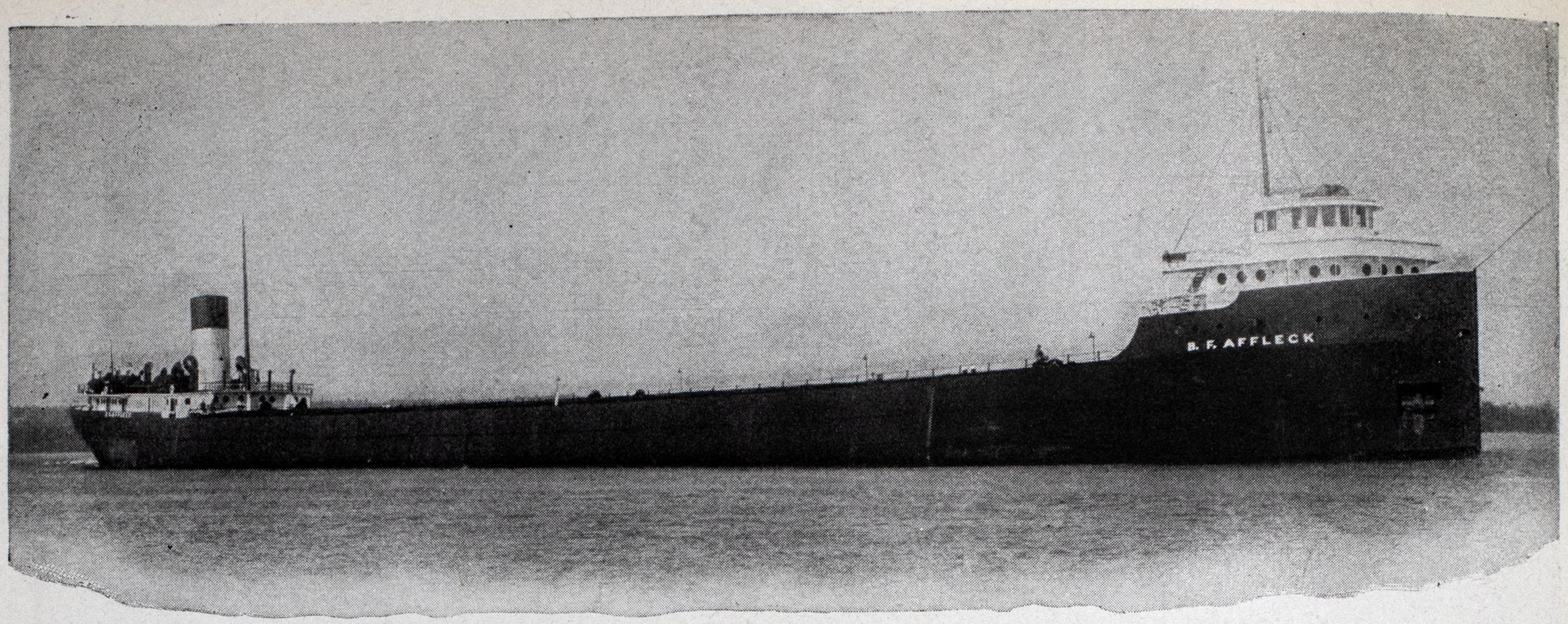
THREE YEARS' service—where previous bearings lasted only THREE TO FOUR MONTHS! Photo shows the 251-foot hopper dredge Sandmaster of the Construction Materials Co., Chicago. On Feb. 21, *1928*, Roy A. Brinkman, superintendent, wrote that they were more than pleased with these bearings after a *year's* service, stating that previous bearings lasted three to four months only. Now after *two more years,* the bearings are still in use!



LARGEST DIESEL TUG now operating in New York harbor equipped with Goodrich bearings. The 100-foot John J. Gallagher, built by the Port Washington Shipyard & Motor Corp., Port Washington, L. I., for the Goodwin-Gallagher Sand & Gravel Corporation of New York City.

Goodrich *Cutless* Bearings

Another B. F. Goodrich Product



B. F. AFFLECK

Finest Type of Great Lakes Cargo Carrier

S.S. B. F. Affleck owned and operated by the Pittsburgh Steamship Company, is a single deck bulk cargo vessel of the standard type built for the iron ore, coal and stone trade of the Great Lakes. Her molded dimensions are: Length overall, 604 feet, length between perpendiculars, 580 feet; width 60 feet and depth 32 feet. Capacity 12,000 tons.

A diversified experience, covering the construction of all types of ships, fully qualifies us to meet *your* requirements thoroughly and with despatch.

Some Other Ships We Have Built

Auto Ferry, LA SALLE
Auto Ferry, ESSEX
Car Ferry, WABASH
Car Ferry, CHIEF WAWATAM
Car Ferry, ST. MARIE
Car Ferry, ANN ARBOR No. 5
Twin Screw Excursion Steamer, THOUSAND ISLANDER
Self Unloading, JOHN W. BOARDMAN

Toledo Shipbuilding Company, Inc.

Toledo, Ohio



When the Roll is Called

Most of the new American-built ships will be present with some Columbian *Tape-Marked* Rope and many will be completely equipped.

There is a preference for Columbian, the Guaranteed Rope, because in practical usage it gives an extra measure of service.

In order to obtain this result, the manufacturer builds extra service into the rope, longer life, greater strength and durability. This is possible because of Columbian's enormous facilities such as control of the pick of manila fibre by Columbian fibre men in the Philippines, the world's most modern cordage mills and vast manufacturing resources.

Utilizing all these facilities to the best advantage in making the famous Columbian *Tape-Marked* Rope assures users of a line that is not excelled. In fact it leads in its water-proofing feature, its strength, durability and flexibility, wet or dry. Put a coil of Columbian to work along side any other line. It welcomes any comparative test.

Columbian Rope Company

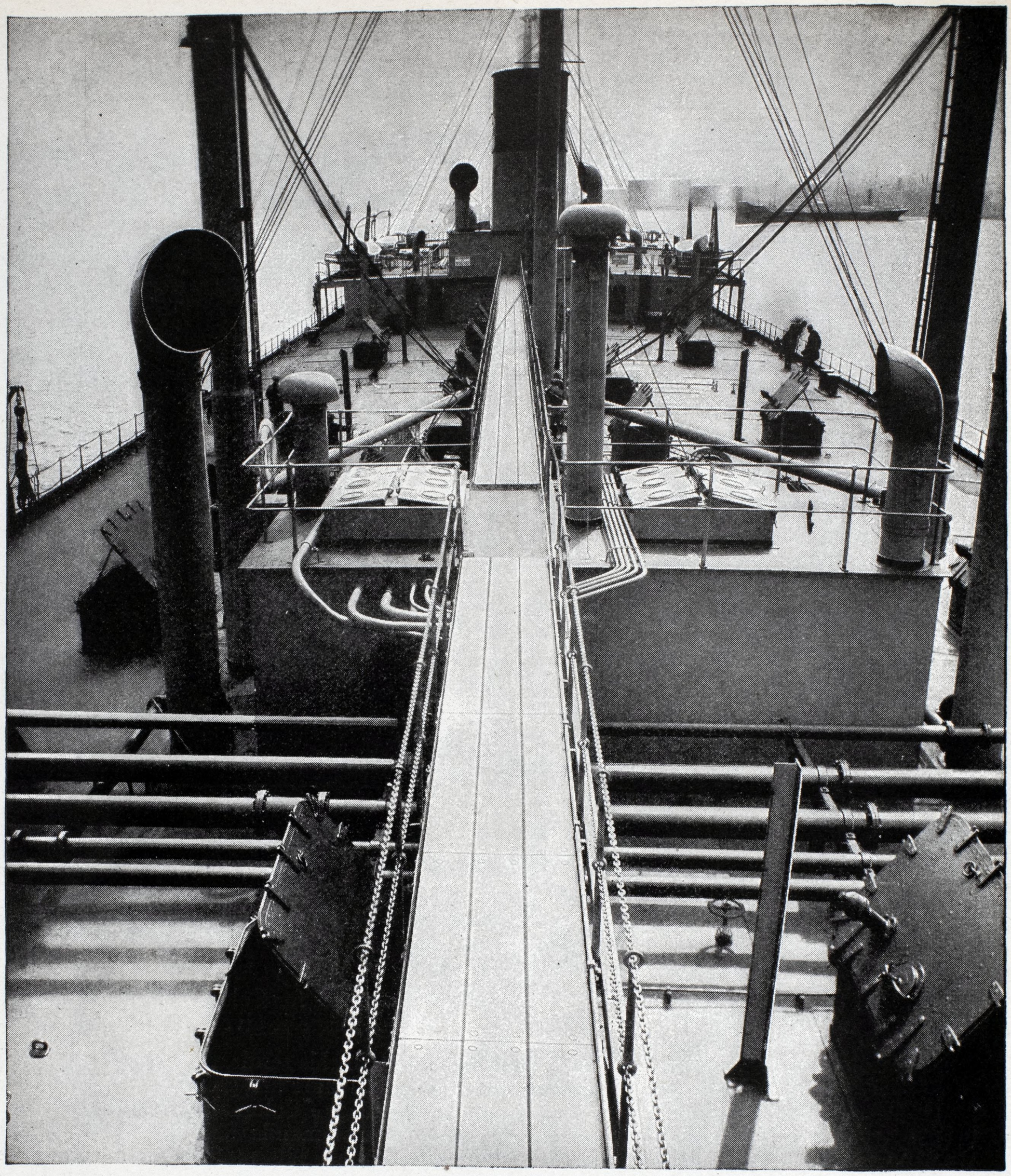
332-390 Genesee Street

Auburn, N. Y., *"The Cordage City"*

Branches:— New York Chicago Boston New Orleans Philadelphia

COLUMBIAN TAPE-MARKED PURE MANILA ROPE

SHIPS GOOD BUILT

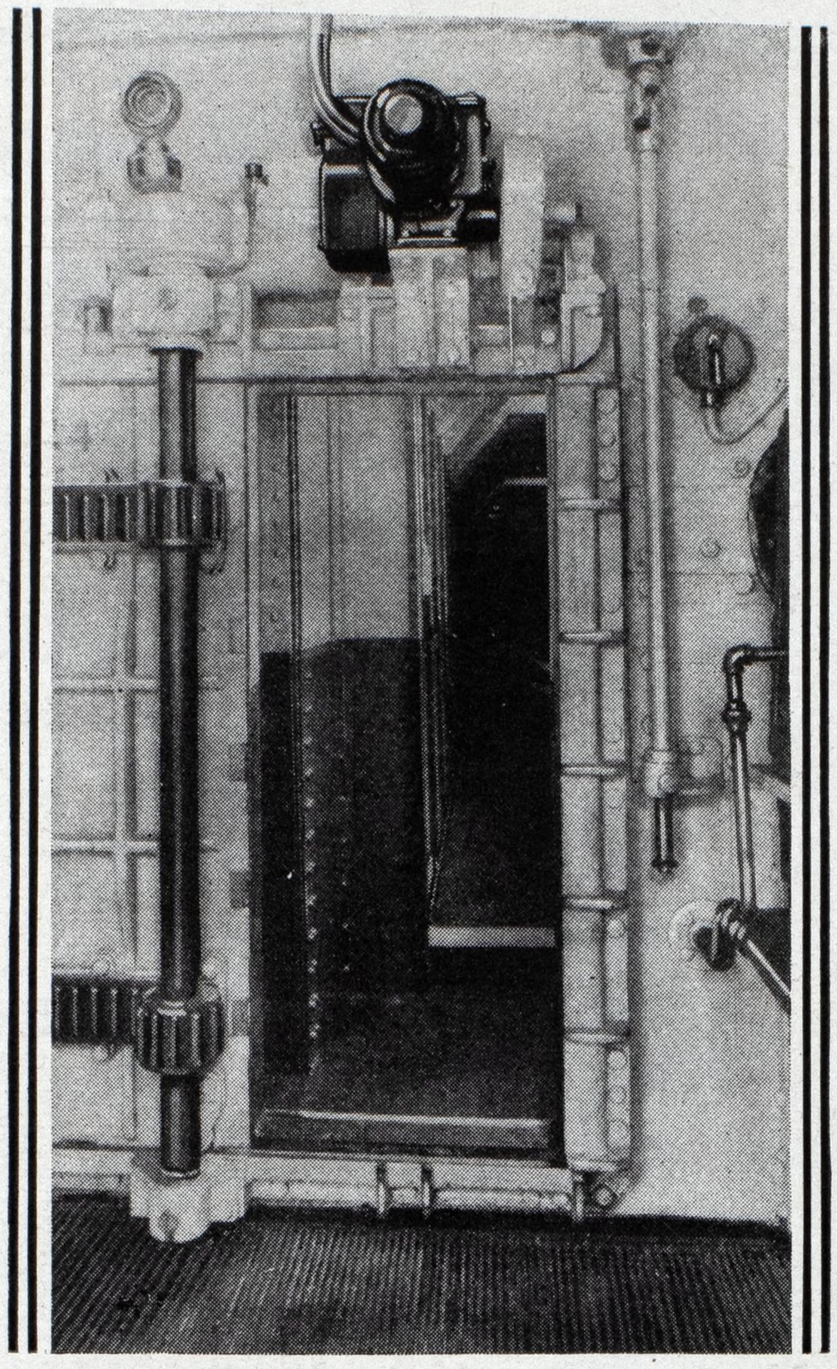


TANKERS ...more than other ships, are dependent for success on the quality of workmanship built into their steel hulls...Strains from deep loading and from operating in ballast impose unusual requirements on the steel structure...Experience in designing and satisfactorily meeting the exacting requirements of some of the largest oil companies, enables Federal to offer tankers built with the one ideal in mind...STEEL WORKMANSHIP OF SUPERIOR QUALITY.

FEDERAL

FEDERAL SHIPBUILDING AND DRY DOCK COMPANY
GENERAL OFFICES AND WORKS: LINCOLN HIGHWAY, KEARNY, NEW JERSEY
SUBSIDIARY OF UNITED STATES STEEL CORPORATION

WHEN WILLING MUSCLES ARE *TOO SLOW*



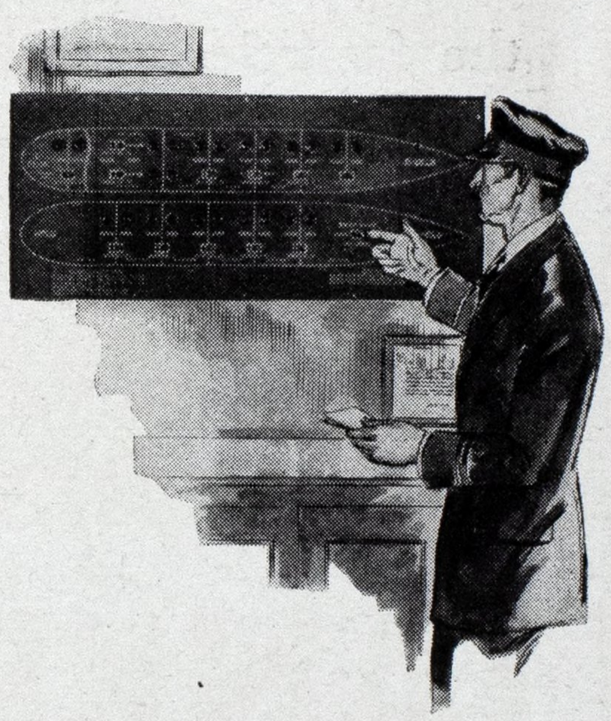
One of the many bulkhead doors operated by the C-H Door Operating System on the S. S. California. Note the compact, simple mechanism.

TODAY, the safety of a ship need not depend upon mere human muscle when a sudden emergency demands the closing of bulkhead doors. Any section of the ship below decks can now be isolated quickly, surely, with the Cutler-Hammer Bulkhead Door Operating System by merely throwing the switch on a master control panel in the pilot house.

The C-H Door Operating System provides electrical control of every bulkhead door. There are two local switches, one on each side of the bulkhead opening, both under the control of the master switch located in the pilot house. This permits *local* operation of each bulkhead but the master switch always assumes precedence when the local control is released. For example, a sailor trapped in a bulkhead can release himself but the door closes again behind him.

The C-H Bulkhead Door Control Unit has a powerful high starting torque motor which snaps on when the control switch is thrown. To prevent stalling, the motor makes one complete revolution before the famous C-H "unseating-blow" hits the door mechanism with a sharp impact to free it and start it on its way either to open or shut. The motor has reserve power for any crisis and is moisture proof. No pipes or bulky mechanism to get out of order—only the simplest wiring system is necessary. And the C-H System does not interfere in any way with manual operation.

C-H Door Operating System was installed on the first U. S. vessel to have motor-operated bulkhead doors—followed by many other installations. Any ship can have the same protection, for the C-H System meets every requirement of the International Conference on Safety of Life at Sea. Ask for full details.



The pilot house control board of a C-H Door Operating System shows a plan of the ship with a master switch for each operating unit in the same relative position as the bulkhead door in the vessel. Lights at each switch indicate whether door is open, moving, or shut. This C-H Control Panel is located in the pilot house of the S. S. California of the Panama-Pacific Steamship Co.

CUTLER-HAMMER, Inc.

Pioneer Manufacturers of Electric Control Apparatus

1322 St. Paul Ave., MILWAUKEE, WISCONSIN

CUTLER HAMMER

Motor-Driven Bulkhead Door Operating Systems

(A-317)

If it can be done United can do it

UNITED has brought new standards of efficiency and service to the field of marine repairs.

WITH five modern, complete plants it is meeting the needs of shipping with an ability developed by its yards in more than half a century of experience.

UNITED is proud of its ability to perform a little or a big task in a workmanlike manner. It has the skill, the manpower and the facilities, coupled with a determination to render a superior service to the shipping industry.

The Mark of Quality in Ship Repairs

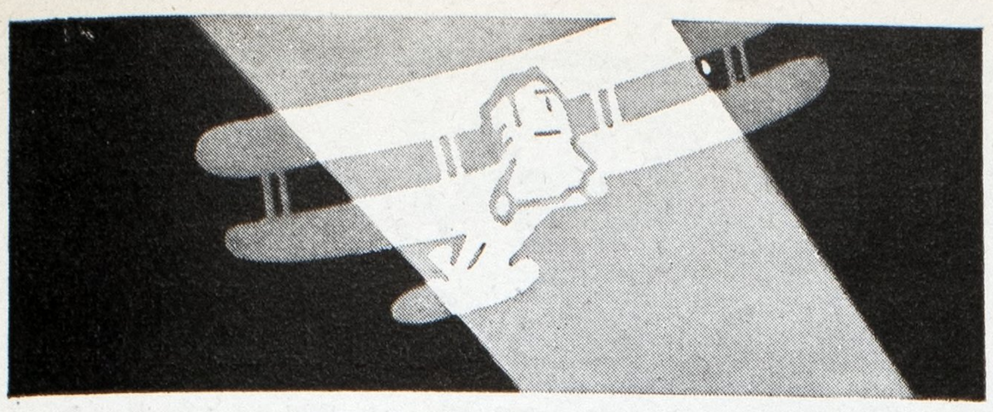
United Service is Superior Service

STATEN ISLAND-MORSE-SHEWAN-FLETCHER-CRANE
UNITED DRY DOCKS
SHIPBUILDING REPAIRS
11 BROADWAY NEW YORK-DIGBY 0500

UNITED DRY DOCKS

Incorporated

11 Broadway DIGby 0500 New York

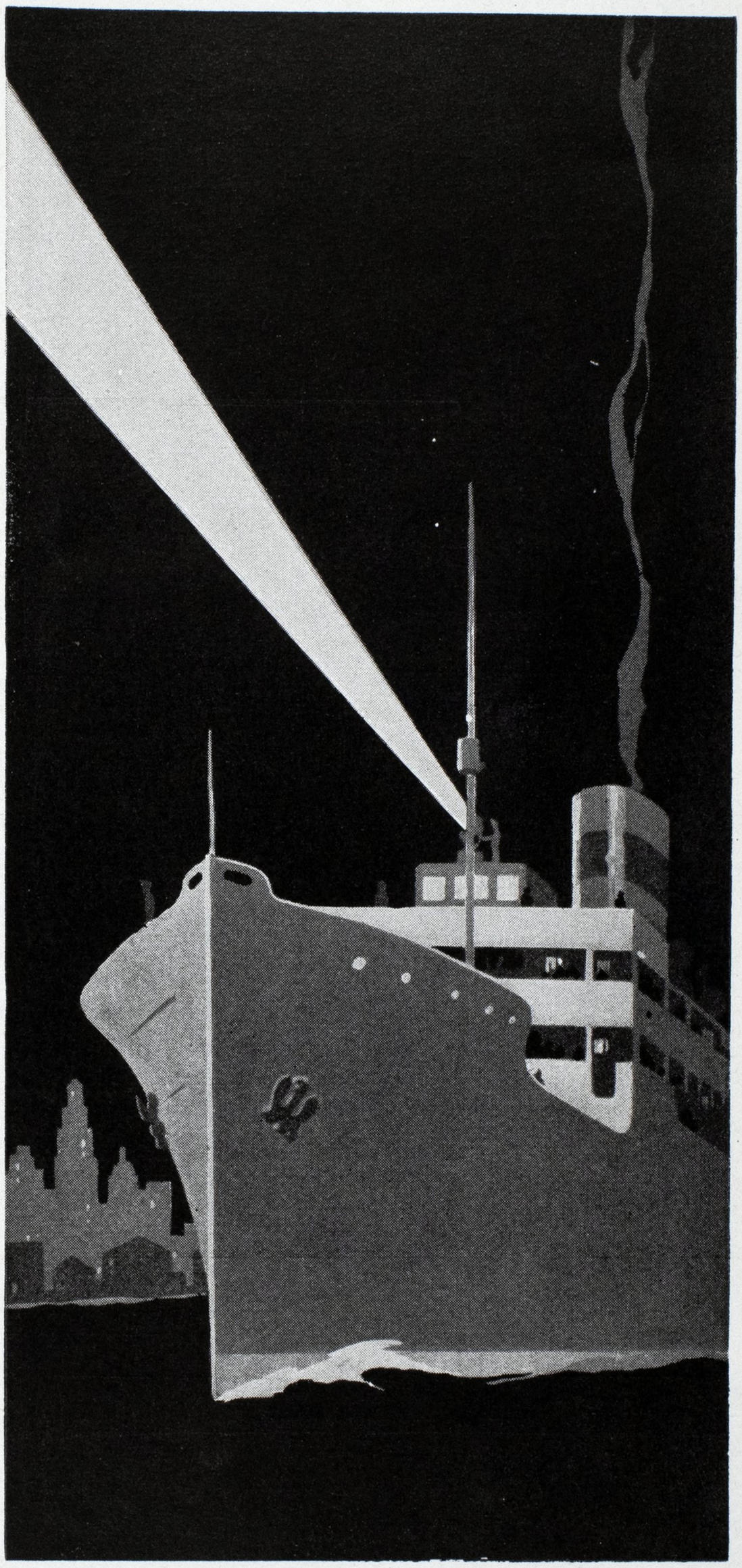


THE SEARCHLIGHT

LIST the searchlight among the abused and misused accessories on shipboard. Exposed to the elements, carelessly handled, seldom if ever overhauled, it is, nevertheless, expected to perform on short notice as a navigational aid, as a floodlighting unit in critical times at sea, or for the entertainment of the passengers.

Yet searchlights are built to do these many tasks—do them and do them well. G-E marine searchlights are products of the same scientific skill which has created so many marvels of illumination on land. Incandescent and carbon-arc types of correct size and power, and with a method of control precisely suited to the needs of various ships, are available to discriminating operators.

The unsurpassed experience and facilities of General Electric are ever at the disposal of ship builders and ship owners who, by means of electrification, would keep in step with maritime progress.

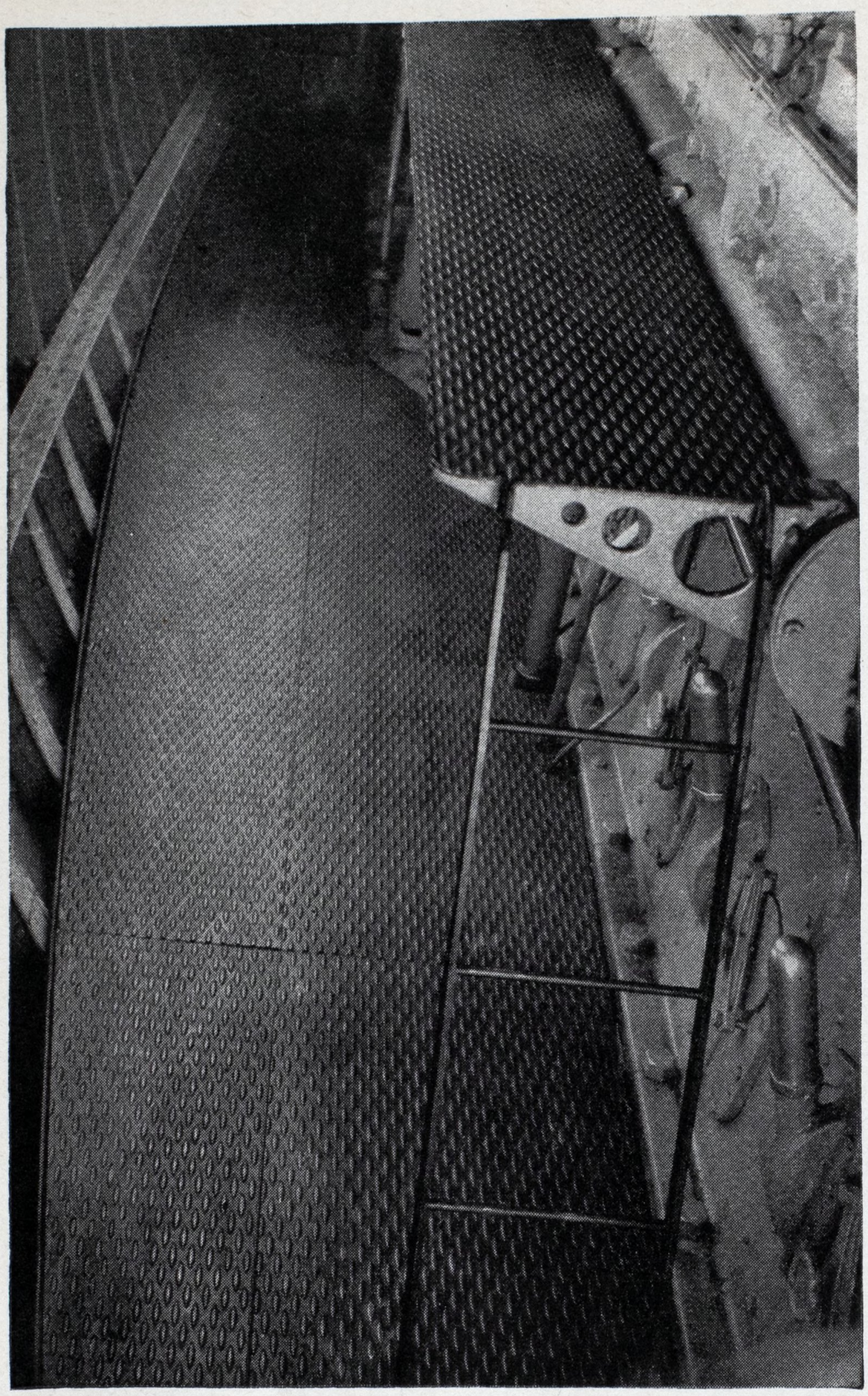


711-43

JOIN US IN THE GENERAL ELECTRIC HOUR, BROADCAST EVERY SATURDAY EVENING ON A NATION-WIDE N.B.C. NETWORK

GENERAL ELECTRIC

SALES AND ENGINEERING SERVICE IN PRINCIPAL CITIES



SAFE . . . in any weather!

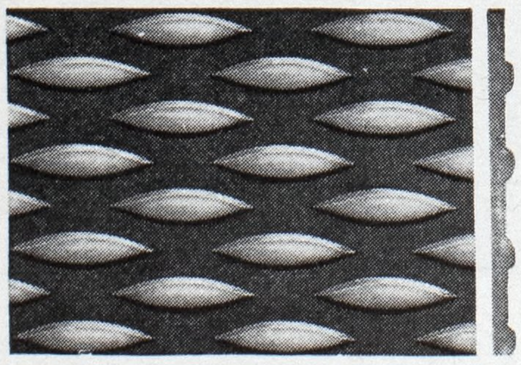
ENGINE room floors, platforms and runways are safe for the walker in every weather when they are made of "A. W." Diamond Pattern Rolled Steel Floor Plate.

The raised pattern of oval-shaped, bevel-edged and rounded-top diamonds gives the walker confidence and prevents side-slipping with the roll of the ship.

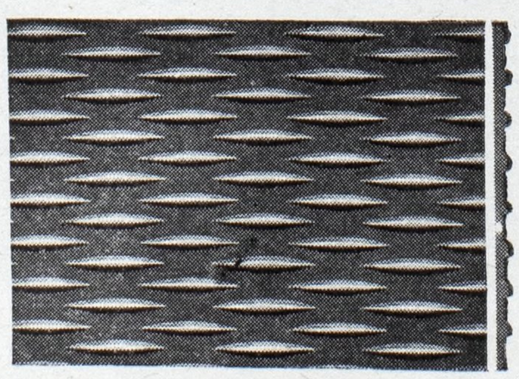
Because the tops of the diamonds are rounded (not flat), water and oil cannot remain on the raised pattern. Thorough drainage is provided from every angle.

"A. W." Floor Plate is made in two patterns, as illustrated below. It is rolled in thicknesses, widths and lengths to meet every need, and can be furnished in steel and all commercially-rolled metals. Write for samples and booklets.

"A.W." Diamond
(¼ size)



"A.W." Diamondette
(¼ size)



ALAN WOOD STEEL CO.

CONSHOHOCKEN, PA.

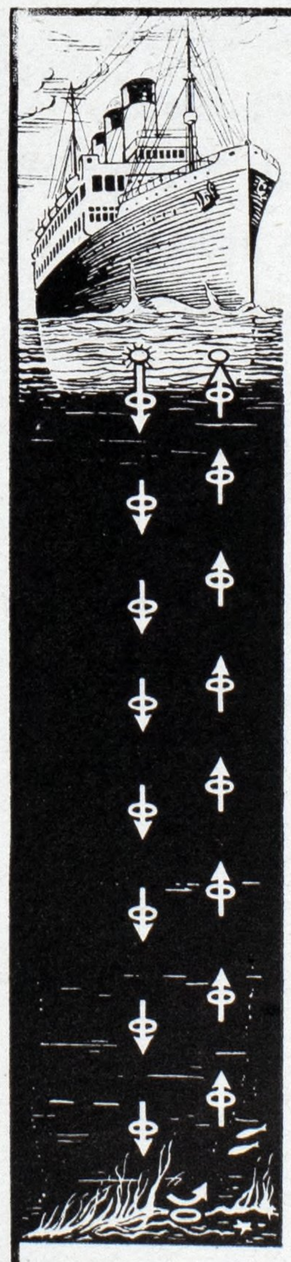
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New York
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BRUNSWICK-KROESCHELL REFRIGERATION

"The STANDARD for ALL Marine Installations"

Brunswick-Kroeschell Company
ENGINEERS AND MANUFACTURERS
Refrigerating and Ice Making Machinery
NEW BRUNSWICK, N. J. · CHICAGO, ILL.
Branches, Distributors and Service in Principal Cities



Fathometer

VISUAL ECHO SOUNDINGS

MANY soundings a minute are available at the turn of the Fathometer switch. The Navigator can obtain instantly on the Fathometer Dial the depth in fathoms beneath the keel. Constant knowledge of depth allows position to be known.

The Fathometer is a modern aid to navigation—a check to other navigating aids. Now installed on vessels of the U.S. Lines, Cunard, North German Lloyd, United Fruit, Moore & McCormack, AGWI Lines and many others.

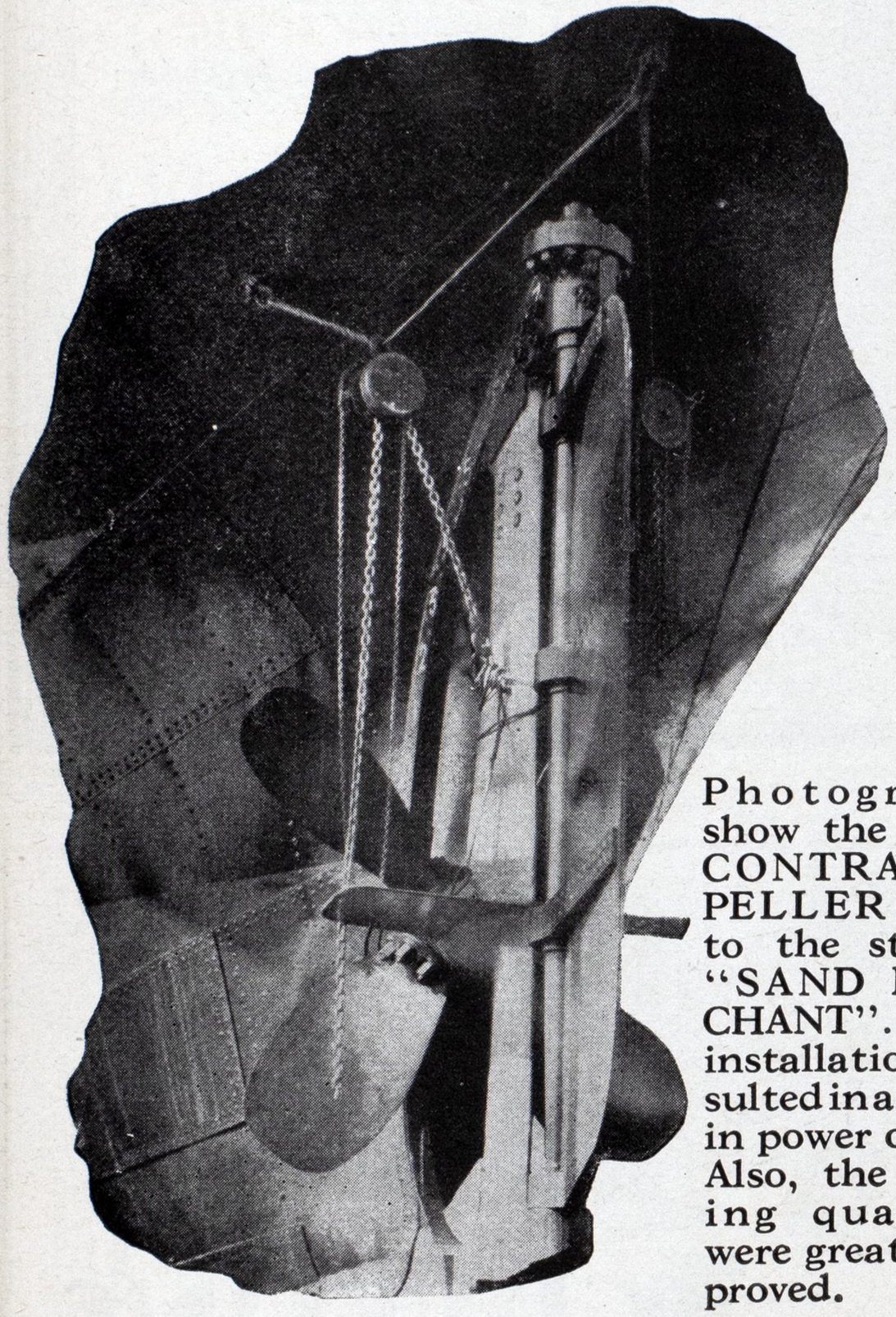
Submarine Signal Company
160 State Street :: Boston, Massachusetts :: U.S.A.

MANUFACTURERS OF
Fathometers *for* Echo Sounding
Oscillators *for* Submarine Signaling
Submarine Receivers *for* Direction Finding
Synchronous Signal Equipment *for* Distance Finding

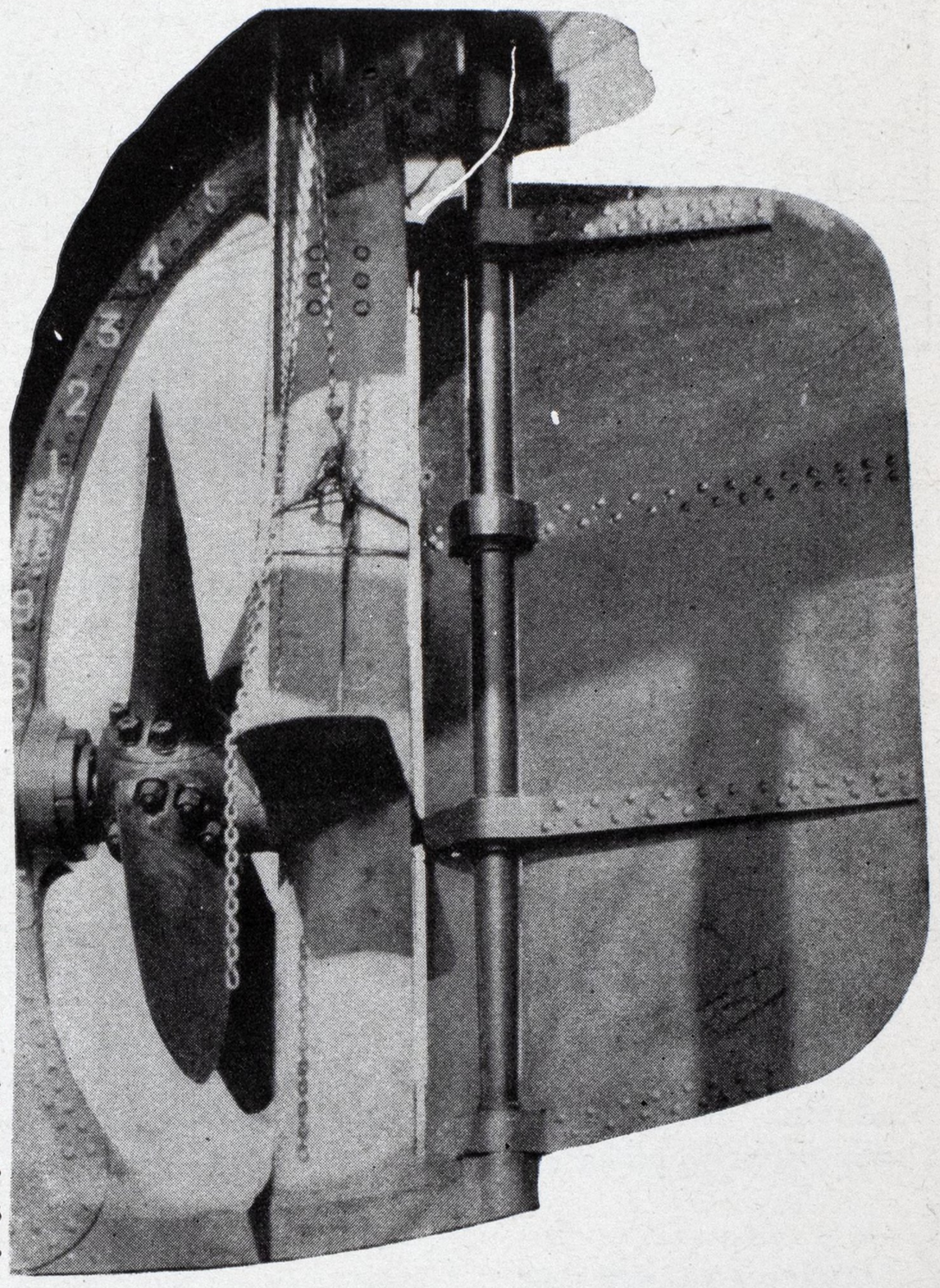
Collingwood Shipyards Limited

Collingwood, Ontario

Sole Licencees for Canada—for Star Contrapropellers and Rudders



Photographs show the STAR CONTRAPROPELLER fitted to the steamer "SAND MERCHANT". This installation resulted in a saving in power of 12%. Also, the steering qualities were greatly improved.



STAR CONTRAPROPELLERS have been fitted to 425 vessels representing 2,577,181 tons with an aggregate of 1,035,493 I. H. P.

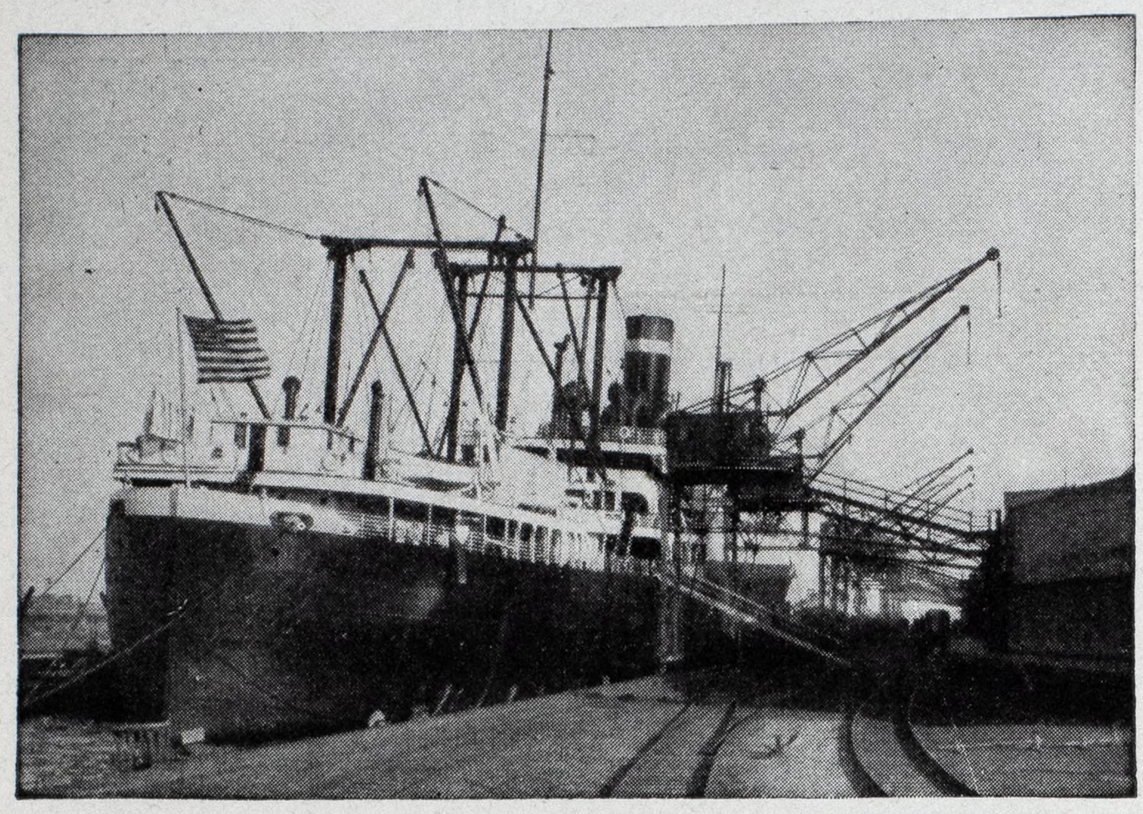
The main advantages are:

Saving in power of from 10% to 15% for the same speed.
Increase in speed of from 5% to 10% for the same power.
Improved steering, which is important in handling ships in canals and narrow waterways.

Reduction in vibrations.
The Contrapropeller is applicable to all types of vessels.

PLANS AND ESTIMATES WILL BE FURNISHED ON APPLICATION

Taking STRIDE for STRIDE with OUR INDUSTRIES



BY EWING GALLOWAY, N.Y.

An American vessel discharging cargo at Bremerhaven

PHENOMENALLY though America's industries have expanded since the war, the growth of the American Merchant Marine has kept pace with them. Today, as in the days of the Yankee Clippers, an ample fleet of modern, well-manned American vessels stands ready and able to meet every shipping need of the nation.

This great Merchant Marine—made up of the hundreds of ships in the 17 lines owned by the United States Shipping Board and those in the many lines developed by the Shipping Board but now under private ownership—provides the swiftest, safest, most economical transportation for all American products.

The advice and counsel of the experienced American operators of the Shipping Board lines are at your command at all times. These experts will be glad to help you solve your transportation problems.

★ ★ ★

*AMERICA FRANCE LINE
*AMERICAN BRAZIL LINE
*AMERICAN DIAMOND LINES
DIXIE UK LINE
*AMERICAN PIONEER LINE
DIXIE MEDITERRANEAN LINE
MISSISSIPPI VALLEY
EUROPEAN LINE
YANKEE LINE
GULF WEST
MEDITERRANEAN LINE
MOBILE OCEANIC LINE
AMERICAN GULF ORIENT LINE
AMERICAN REPUBLICS LINE
ORIOLE LINES
SOUTHERN STATES LINE
TEXAS MEDITERRANEAN LINE
TEXAS UKAY LINE
TEXAS STAR LINE

**Accommodations available for a limited number of passengers on these lines*



BY EDWIN LEVICK, N.Y.

Another shipment of American goods bound for foreign consumption. This scene is typical of the way the ships of the 17 lines listed here can make the world your market.

UNITED STATES SHIPPING BOARD MERCHANT FLEET CORPORATION

WASHINGTON, D.C.



TRAVEL via LAKE ERIE

LET THE C & B LINE be your host between Cleveland and Buffalo or Cleveland and Port Stanley, Canada.

Beautiful scenery. Comfortable staterooms, luxurious cabins, wide decks. Excellent dining room service and courteous attendants. Music and dancing on the Great Ship "SEEANDBEE".

Autoists, save a day C & B Line way. Avoid miles and miles of congested roadway and rest while you travel.

Cleveland—Buffalo Division

Steamers each way, every night, leaving at 9;00 p.m.; arriving 7:30 a.m. (E.S.T.) April 15th to Nov. 15th. **Fare $5.00 one way; $8.50 round trip. Autos carried $6.50 and up.**

Cleveland—Port Stanley, Canadian Division

Steamer leaves Cleveland at midnight, arriving at Port Stanley, 6:00 a.m.; returning, leaves Port Stanley, 4:30 p.m. arriving at Cleveland, 9:30 p.m. (E. S. T.) June 20th to Sept. 6th. **Fare $3.00 one way; $5.00 round trip. Autos carried $4.50 and up.**

Write for details on Triangle, Circle and All Expense Tours; also 1930 Cruise de Luxe to Chicago via Sault Ste. Marie. Ask for free Auto Map and Folder No. 5.

THE CLEVELAND AND BUFFALO TRANSIT COMPANY

Cleveland, Ohio -:- Buffalo, N. Y.
Times Bldg., New York City



DIXON'S *fingerprints*

written in FLAKE GRAPHITE *for more than 100 years*

This is the identifying mark of *Dixon's . . . Graphite.* The combination, *Dixon's* and *Graphite,* have been synonymous all over the world for more than 100 years.

And, another word that is closely linked with these two is—*lubrication.* These three are inseparably linked in the minds of thousands of mechanics, maintenance men, and engineers, for unquestionably *Dixon's Flake Graphite* has its place in every well planned scheme of lubrication, and as an auxiliary lubricant with oils and greases it is generally recognized as benefiting the base lubricant.

If you have never had the *how, where* and *why* of Dixon's Flake Graphite lubrication explained to you, write for it today. Or, better still, send us an outline of your lubricating problems and we'll tell you how Dixon's can help you.

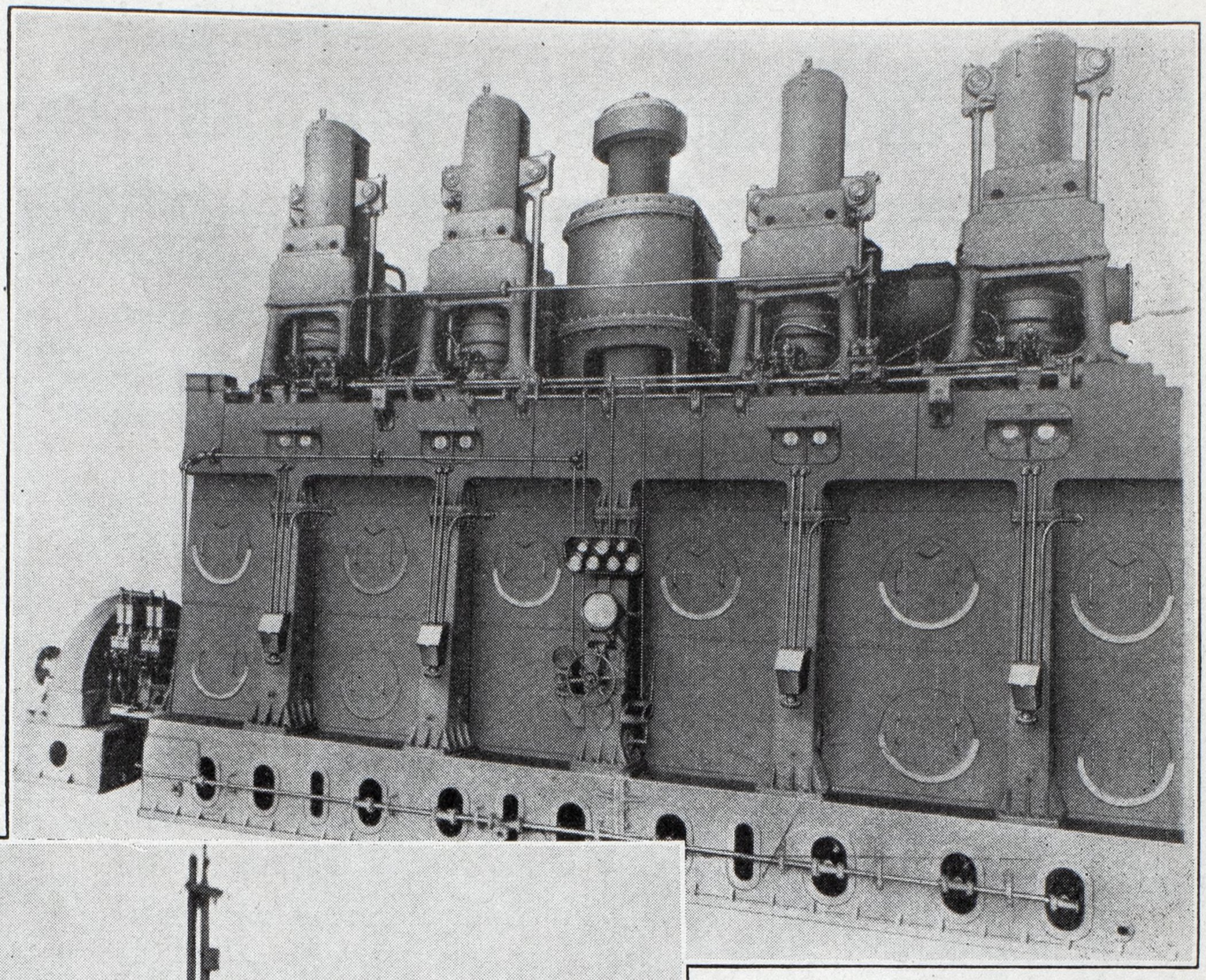
Joseph Dixon Crucible Company

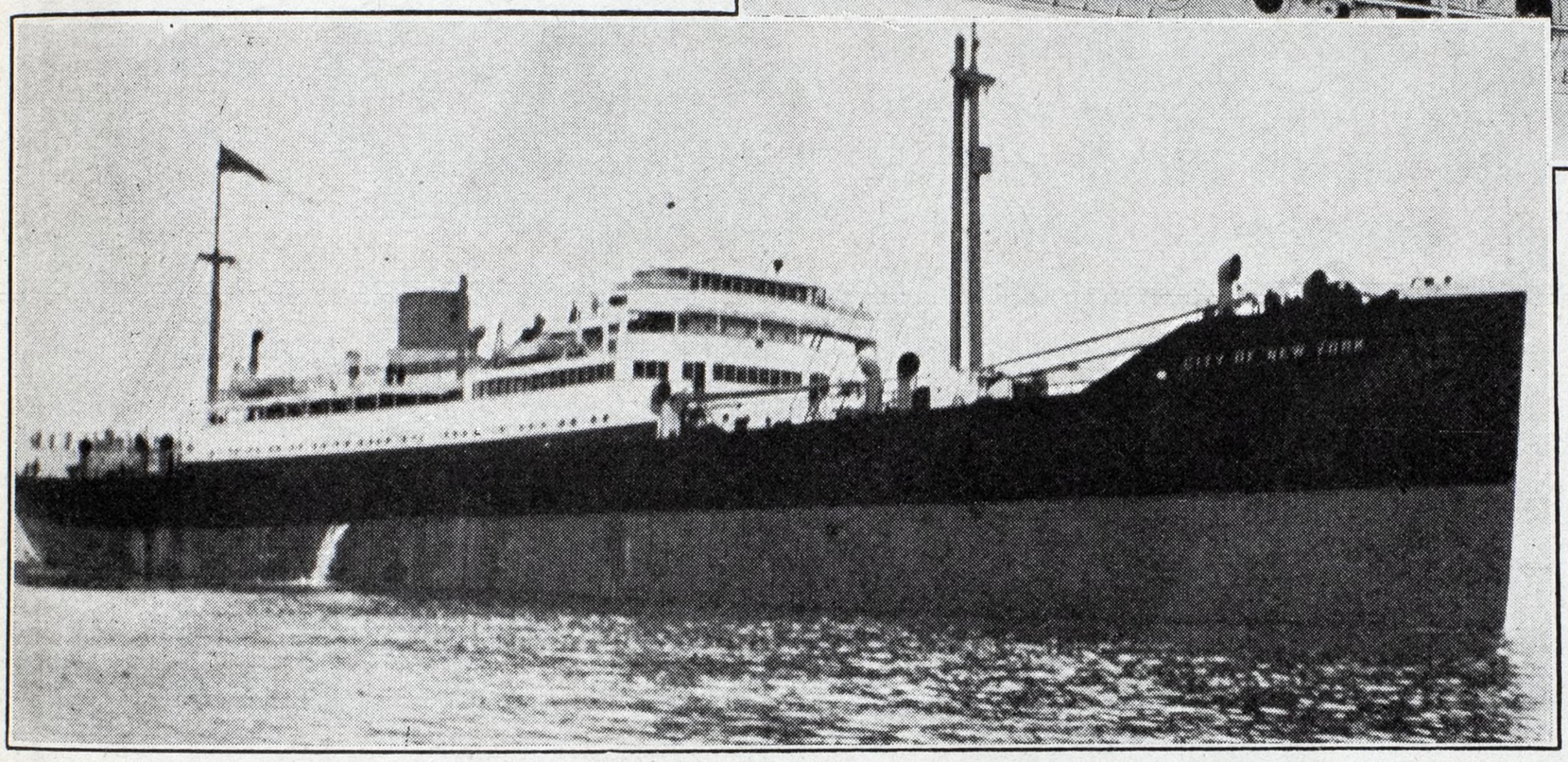
Jersey City D X N TRADE MARK **New Jersey**

Established 1827

Power with Efficiency

SUN-DOXFORD Opposed-Piston DIESEL ENGINES





The Ms. City of New York, first big combination freight and passenger motorship built in America, is owned by the American South African Line. Her length is 470 ft. 8 in., deadweight capacity 9350 tons, first class passenger accommodation 60, power 5400 s.h.p. and speed 14 knots

Builders of

Passenger and Cargo Vessels—Oil Tankers

Unlimited facilities for

MARINE REPAIRS

Two floating Dry Docks

11,000 Tons Lifting Capacity Each

SUN SHIPBUILDING & DRY DOCK COMPANY

Shipyard & Main Office
CHESTER, PA.

25 Broadway
NEW YORK

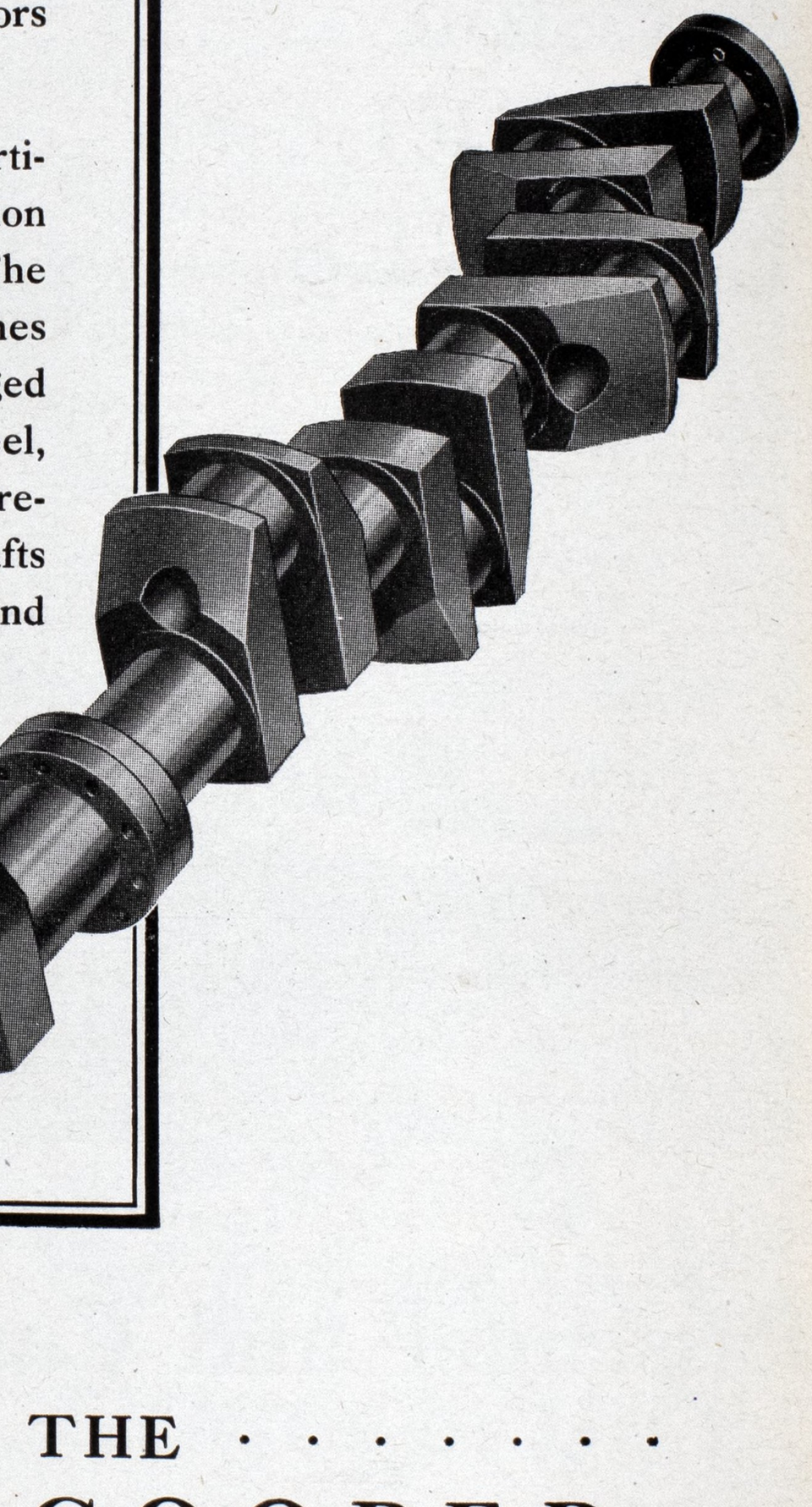
CERTIFIED . . . . .

CRANKSHAFTS *for* GREATER STRENGTH AND SMOOTHER POWER

All Cooper-Bessemer Diesel engine shafts are built to the specifications of both Lloyd's and A. B. S., and are inspected, certified and stamped by the inspectors of these organizations.

The size, strength, precision manufacture and certification of these shafts characterizes the construction of Cooper-Bessemer Diesel engines throughout. The crankshafts of all Cooper-Bessemer Diesel engines are unusually large in diameter. Each shaft is forged from a solid billet of high-grade .30-.40 carbon steel, annealed, rough turned, heat treated, seasoned, re-centered and precision finished. These crankshafts being both over-size and over-strength will withstand the strains of the most severe service. Criticals within the operating range are eliminated.

This high standard of manufacture assures you a power plant whose serviceability cannot be excelled —an engine that will perform both reliably and economically in any type of marine service.



THE . . . . . .

COOPER-BESSEMER CORPORATION

General Diesel Sales Offices

Suite 301 25 West 43rd Street

NEW YORK CITY

Plants: Grove City, Pa.; Mt. Vernon, O.

Canadian Diesel Representative

DIESEL POWER LTD.

129 Adelaide St., W., Toronto, Ont., Can.

25 to 1200
HORSEPOWER

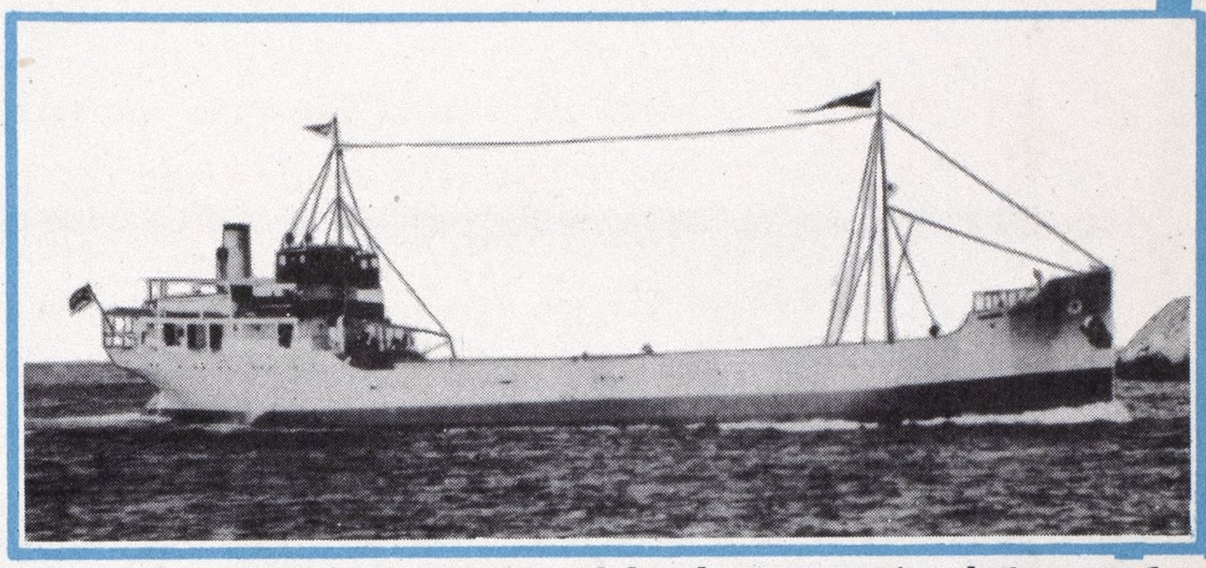
Complete line of Fairbanks-Morse Diesels meets marine power needs . . .

Building a new vessel? Refitting an old one? Then get the facts about Fairbanks-Morse Diesel Engines! Whether your need is for main drive or auxiliary power, you will find that there is an F-M Diesel to suit your requirements.

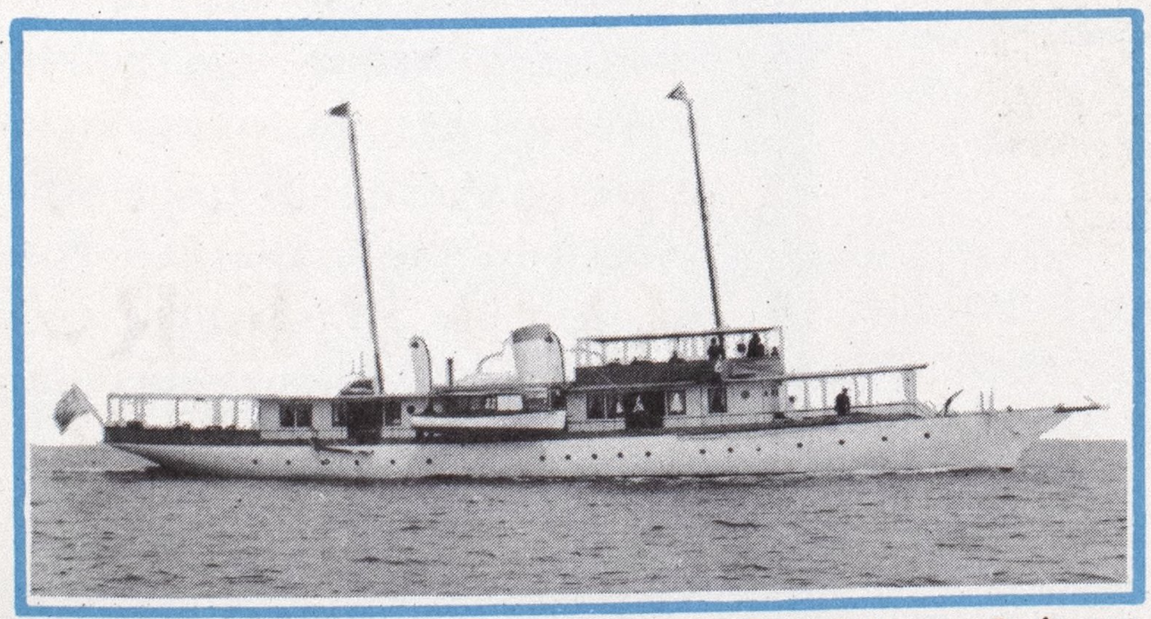
You will be interested in the advantages that Fairbanks-Morse Diesels have to offer . . . Interested because by whatever standards you measure power—these engines will meet them *all*. Fuel economy. Dependability. Low maintenance. Long life. Small space requirements. Wider cruising range. Freedom from attendance demands . . . these are a few F-M Diesel advantages. There are others.

In the Fairbanks-Morse Diesel you will find an engine of the utmost simplicity—a two-cycle, airless injection engine that reflects the practical experience of more than 35 years of building internal combustion engines. Back of every Fairbanks-Morse Diesel is the guaranty of America's largest manufacturer of Diesel engines. Back of these engines, too, are unequaled service facilities . . .

{Continued on next page}



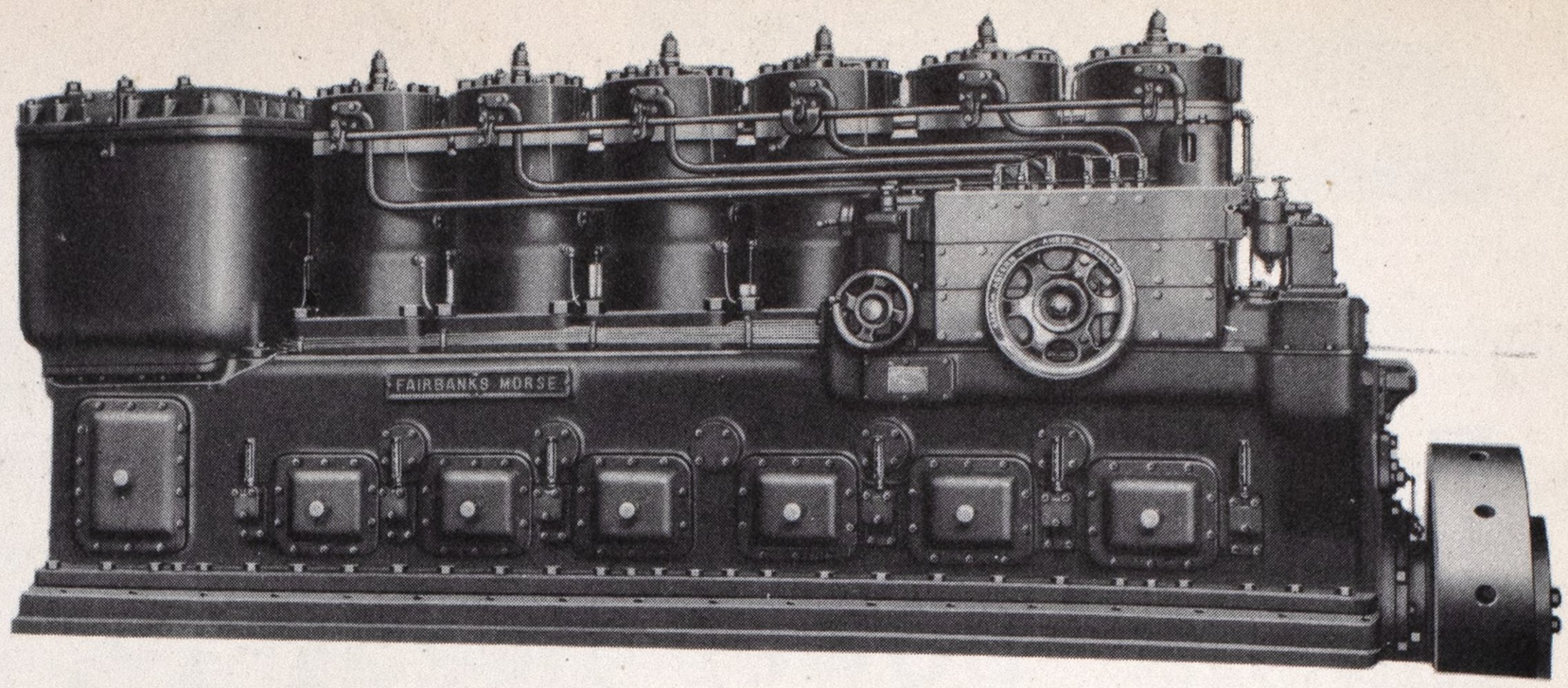
The "Holger Struckmann"—owned by the International Cement Corporation—is powered by two 400-hp. Fairbanks-Morse Diesels.



This yacht was converted from steam to Diesel power. It is now fitted with a 150-hp. Fairbanks-Morse Diesel Engine.

1930
begins the SECOND CENTURY of building FAIRBANKS SCALES

FAIRBANKS-MORSE
DIESEL ENGINES
POWER, PUMPING AND WEIGHING EQUIPMENT



Six cylinder F-M Diesel Engine. Model 37 {cylinder size 10½ x 12½ in.}

{Continued from preceding page}

F-M Service departments are maintained in principal ports the world over.

Interesting information about F-M Diesel Engines will be sent promptly on request. Or, if you prefer, a competent Fairbanks-Morse engineer will discuss your power problem with you at your convenience.

FAIRBANKS, MORSE & CO.
900 S. Wabash Ave., Chicago

Branches with Service Stations in Principal Ports

1930
begins the
SECOND CENTURY
of building
FAIRBANKS SCALES

MODEL 37

Built in sizes from 250 to 1200 hp.

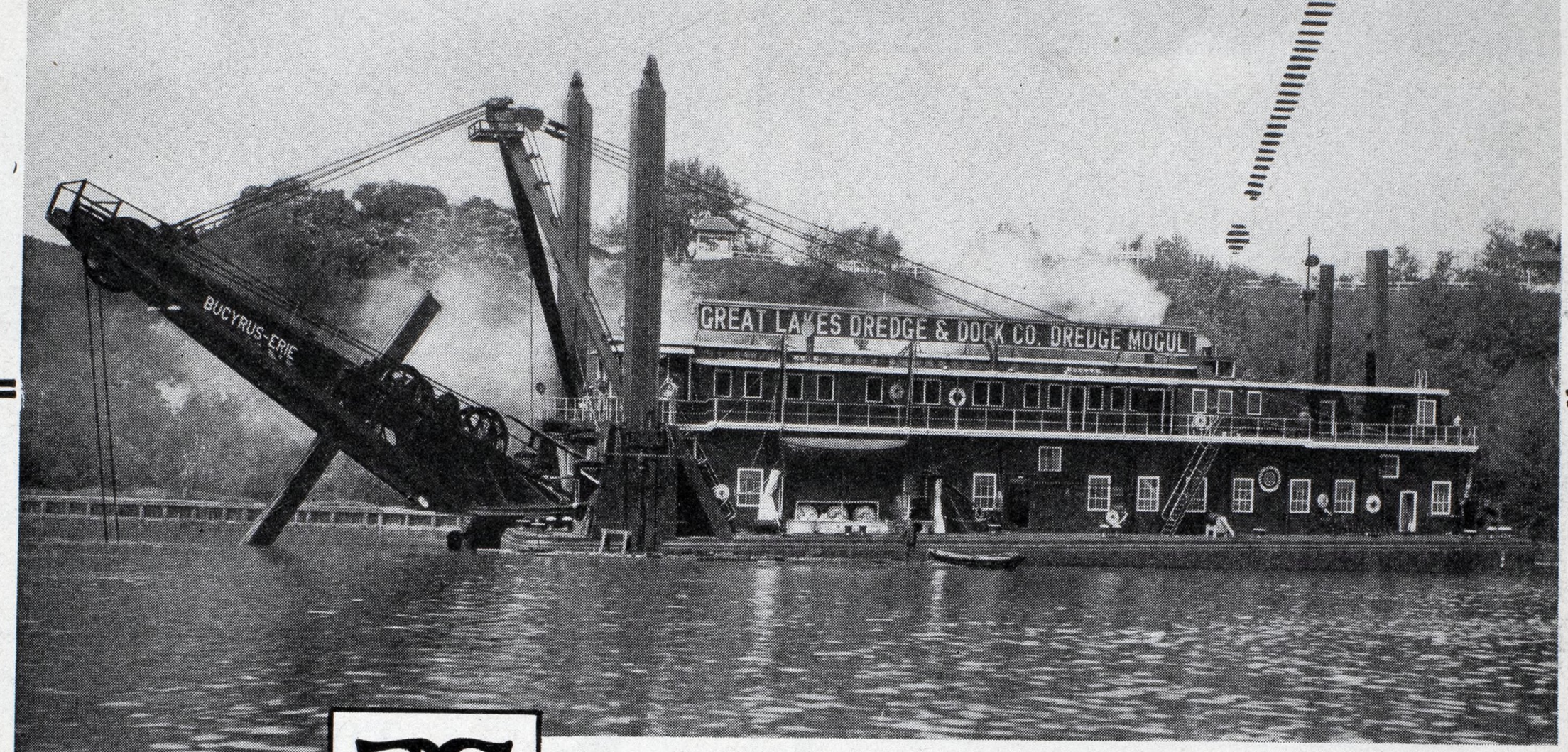
Model 37 offers thoroughly proved features that are unique in American Diesel building. More horsepower per given cylinder size is obtained by providing an additional cooling medium for the pistons—thereby securing greater heat transference. By a unique combination of pressure lubrication with oil cooling, pistons are cooled effectively without the complications and maintenance liabilities encountered in previous attempts to introduce piston cooling. As the oil reservoir is placed in the crankcase, combustion air is provided by a built-in low-pressure air pump.

OA27.319

FAIRBANKS-MORSE DIESEL ENGINES

POWER, PUMPING AND WEIGHING EQUIPMENT

Another MANITOWOC PRODUCT



THE 8 cu. yd. Diesel Electric Dipper Dredge MOGUL was built for Great Lakes Dredge & Dock Co., Chicago. It is equipped with a 12 cu. yd. dipper for ordinary work but will heap up to a load of 16 yards in lighter materials. An 8 cu. yd. dipper is used for dredging rock. Maximum digging depth is 42 ft. of water. The MOGUL is 156′0″ x 42′6″ x 12′8″—1200 H.P., equipped with Bucyrus-Erie dredging machinery and Busch Sulzer Diesel engine. It has living quarters for a crew of twenty-three men.

It will pay you to consult Manitowoc when in the market for dredges, steel passenger and freight vessels, carferries, tankers, fire boats, sand suckers, tugs, scows, lighters, marine engines, marine boilers, ship auxiliary equipment, etc.

MANITOWOC SHIPBUILDING CORPORATION

Manitowoc, Wisconsin



THE strength of FIBORE — the original Fibre-Core Rope — can be obtained only in this particular type of cordage. Its *single* core in each strand, working as a unit, with all fibres sharing strains equally, is decidedly stronger than the usual group of center yarns, large or small.

The flexibility of FIBORE is the result of all the fibres in each core sliding along one another. There is no cross rubbing or binding, because of the absence of twisted elements. Each core consists of only one big bundle of smooth parallel fibres, protected by layers of cover yarns.

FIBORE'S endurance is a matter of *record* and not merely of advertising.

The underlying principle of the FIBORE type of construction is covered by broad basic patents in the United States and foreign countries.

Our patented WATERFLEX lubrication makes FIBORE truly the *last word* in large rope construction.

NEW PROCESS — NO CENTER YARNS TO BREAK
WHITLOCK
FIBORE
(FIBRE CORE)
MANILA
GREATER STRENGTH — LONGER LIFE — EASIER TO HANDLE

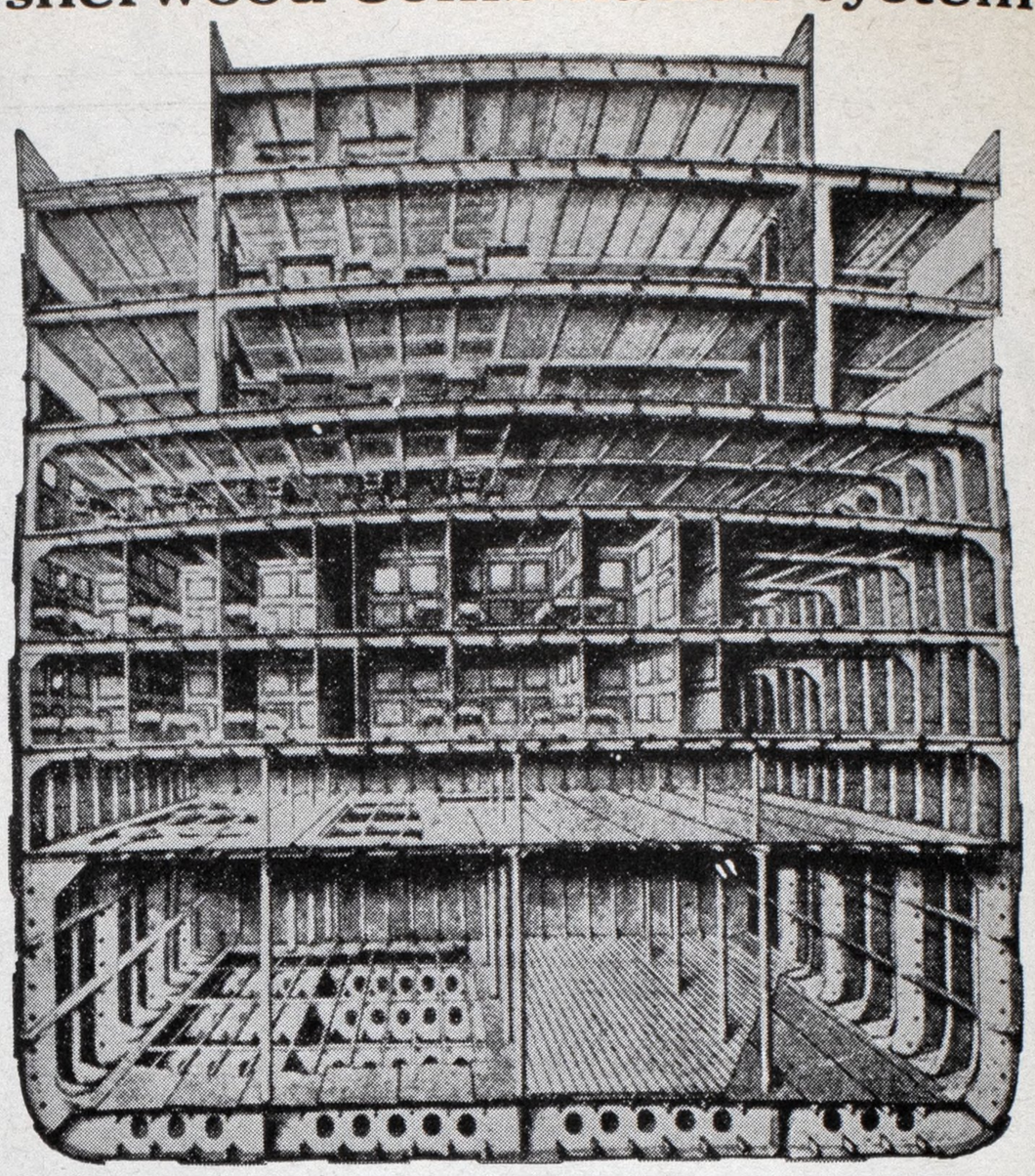
WHITLOCK CORDAGE COMPANY

46 South Street
New York

Factory and Warehouses
Jersey City, N. J.

Branches
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Isherwood Combination System



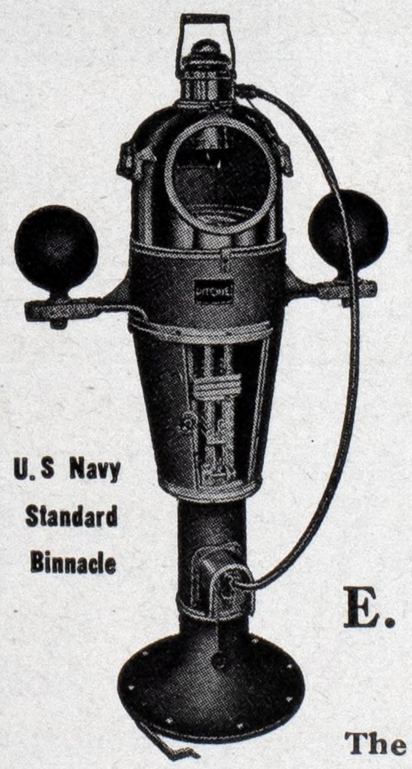
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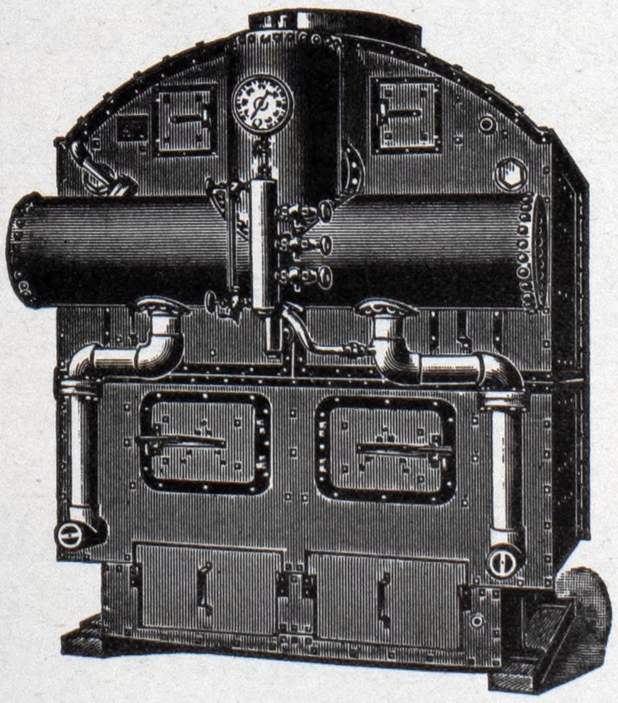
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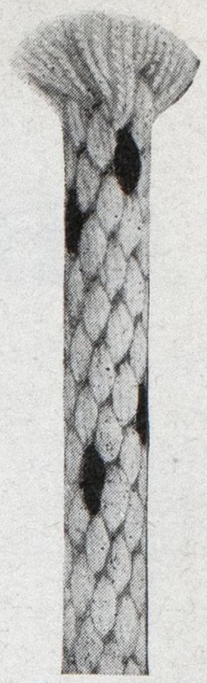
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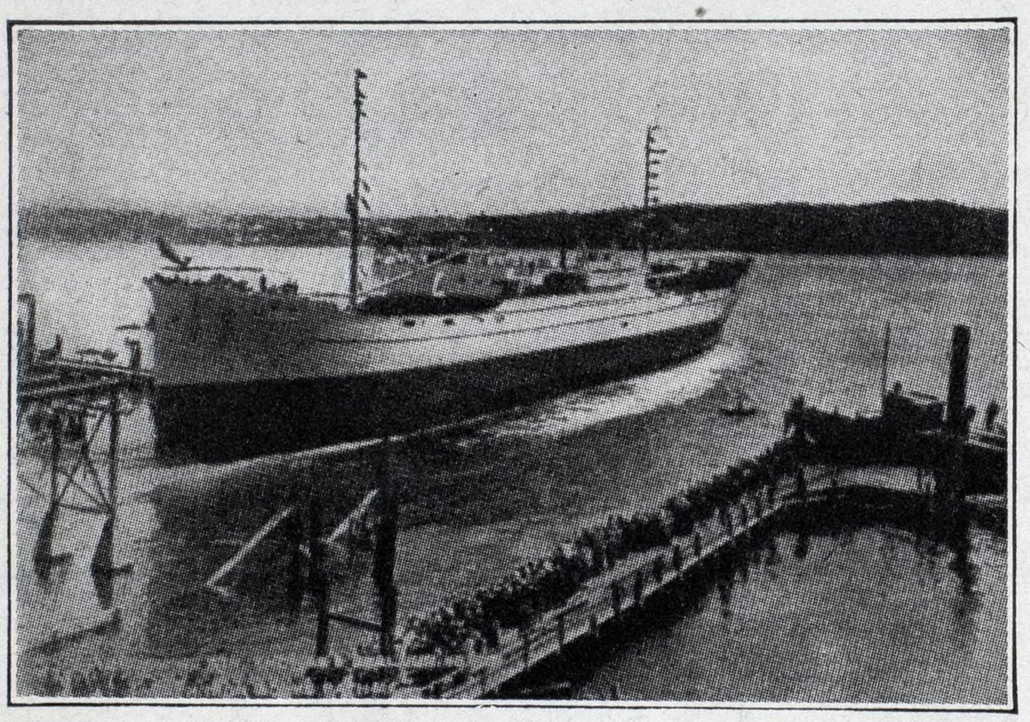
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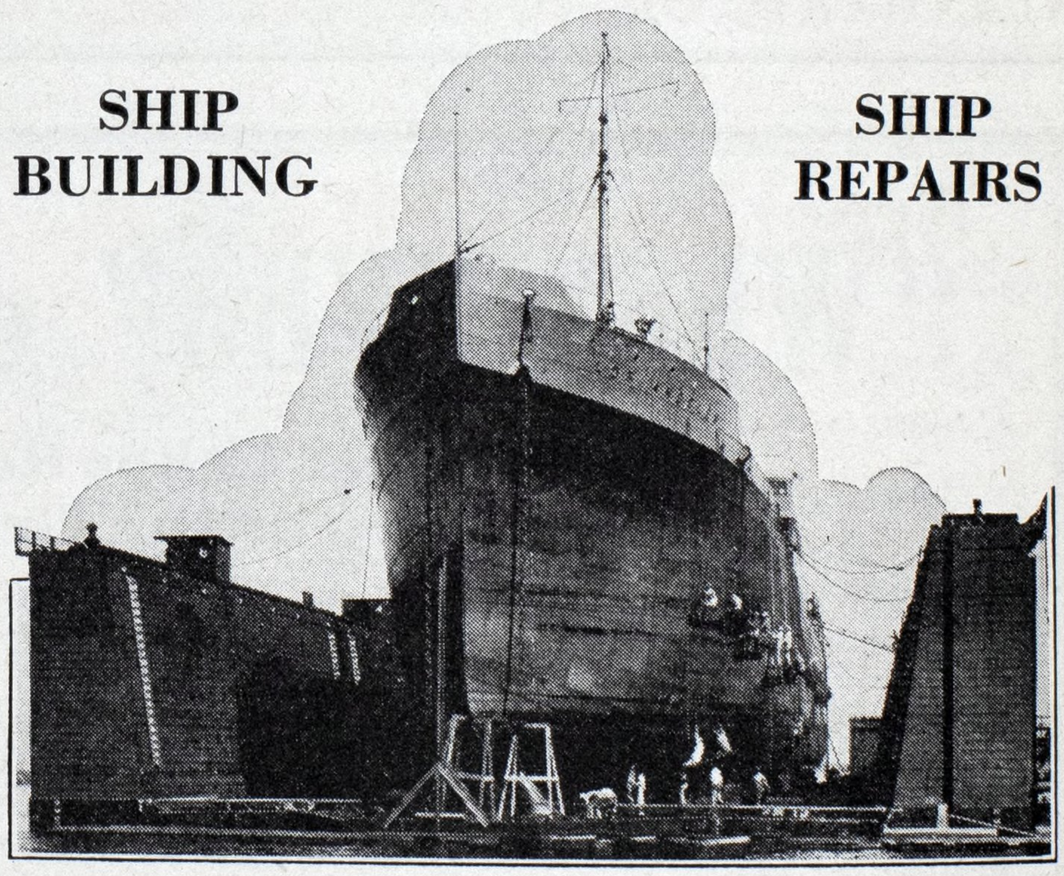
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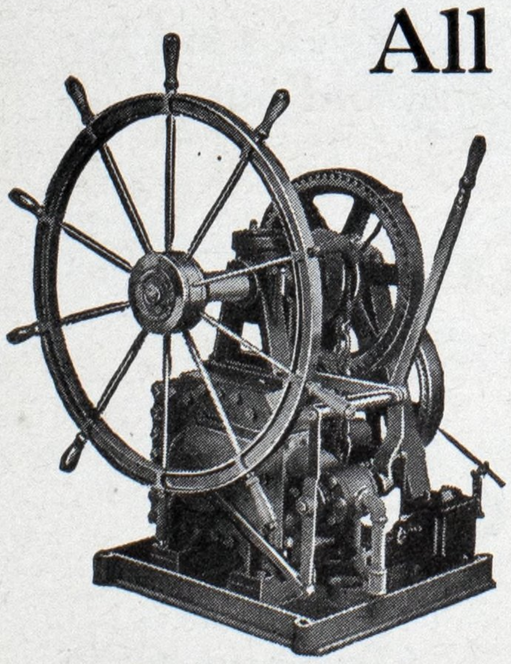
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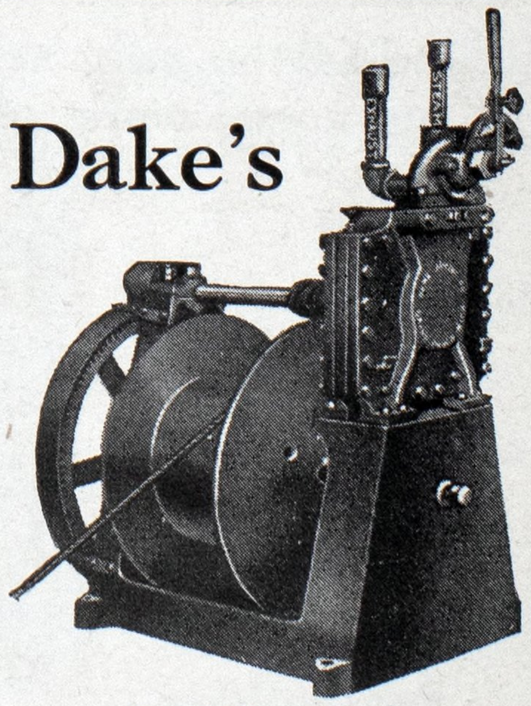


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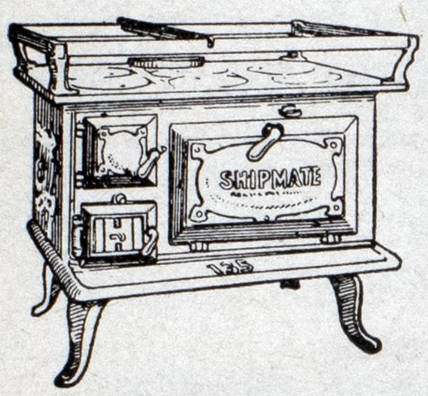
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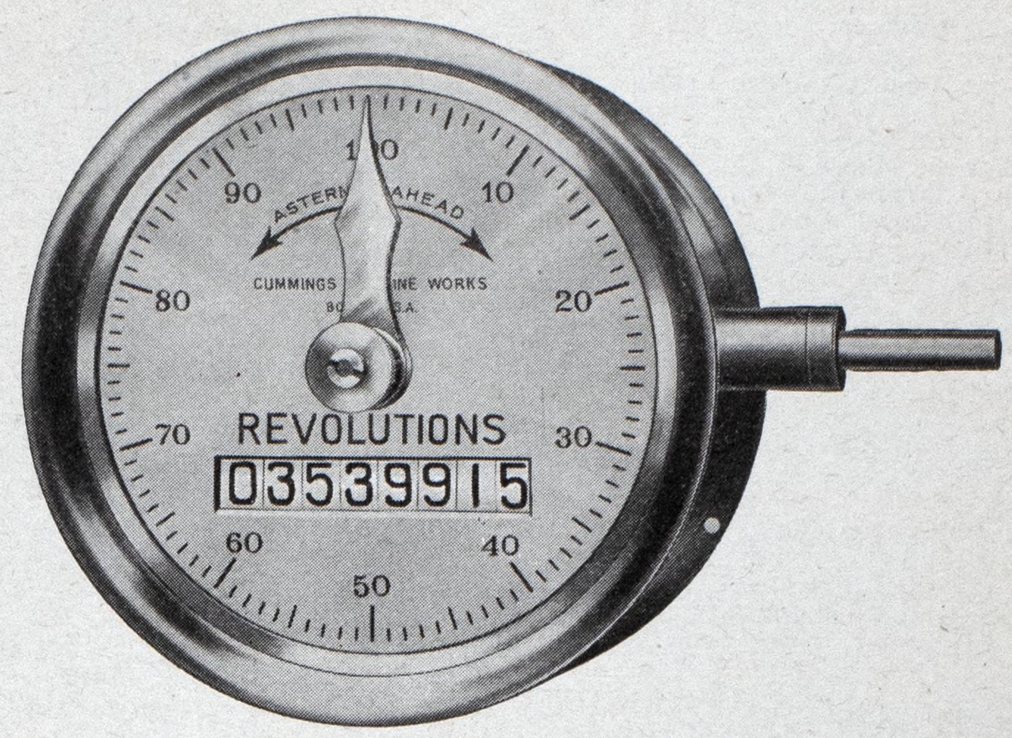
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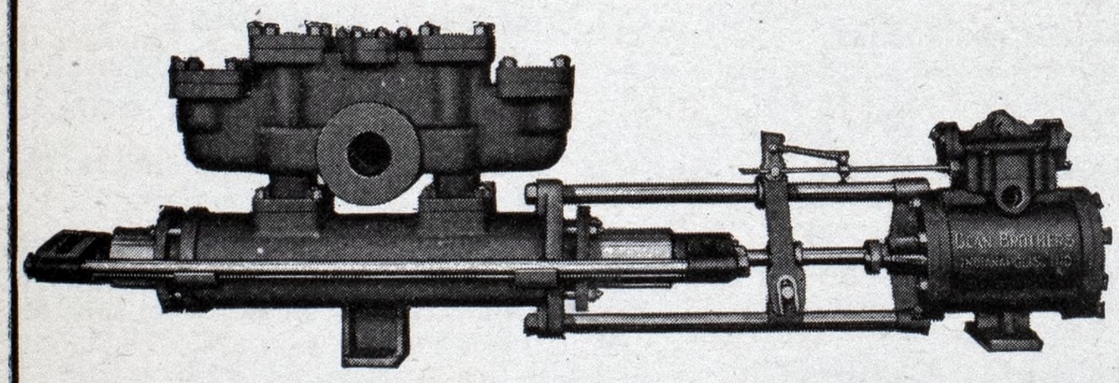


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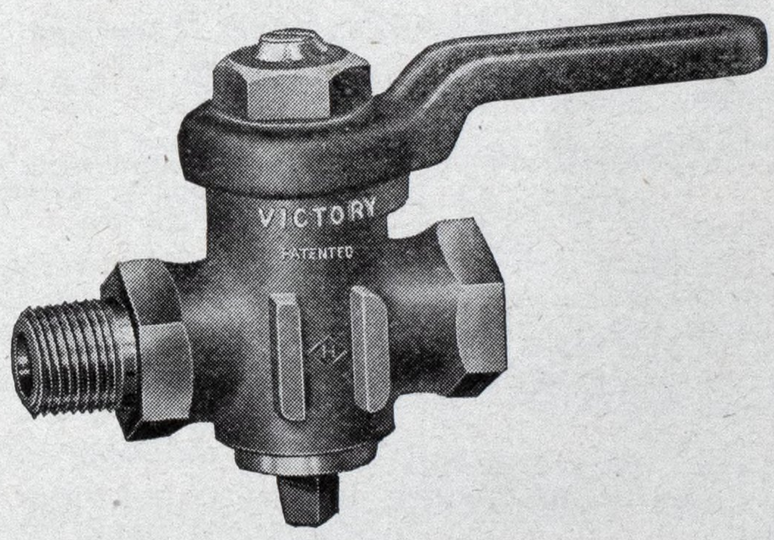
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39 Broadway, New York City.

FUEL OIL
Standard Oil Co. of New Jersey,
26 Broadway, New York City.
Vacuum Oil Co.,
61 Broadway, New York City.

FURNITURE
Marble & Shattuck Chair Co.,
10200 Foster Ave., Cleveland, O.

FURNITURE (Metal)
Simmons Co., The, 666 Lake Shore Drive, Chicago, Ill.

GALLEY RANGES
Stamford Foundry Co.,
Stamford, Conn.

GEARS (Marine Equipment)
General Electric Co.,
Schenectady, N. Y.
Westinghouse Electric & Mfg. Co.,
So. Philadelphia, Pa.

GENERATING SETS
Fairbanks, Morse & Co.,
900 S. Wabash Ave., Chicago, Ill.

GENERATING SETS (Direct Connected)
General Electric Co.,
Schenectady, N. Y.
Sturtevant, B. F., Co.,
Hyde Park, Boston, Mass.
Westinghouse Electric & Mfg. Co.,
So. Philadelphia, Pa.

GENERATORS
Fairbanks, Morse & Co.,
900 S. Wabash Ave., Chicago, Ill.
Westinghouse Electric & Mfg. Co.,
S. Philadelphia, Pa.

GRAPHITE
Dixon, Jos., Crucible Co.,
Jersey City, N. J.

GRAPHITE GREASES
Dixon, Jos., Crucible Co.,
Jersey City, N. J.

GRAPHITE PAINT
Dixon, Jos., Crucible Co.,
Jersey City, N. J.

GRAPHITE PIPE JOINT COMPOUNDS
Dixon, Jos., Crucible Co.,
Jersey City, N. J.

GREASE
Vacuum Oil Co.,
61 Broadway, New York City.

GREASE (Launching)
Vacuum Oil Co.,
61 Broadway, New York City

GYPSEYS
American Engineering Co.,
Cumberland & Arimingo Sts.,
Philadelphia, Pa.

GYRO-PILOT (Automatic Steering)
Sperry Gyroscope Co., The,
Brooklyn, N. Y.

HAMMER RAMS
Heppenstall Co.,
46th & A.V.R.R., Pittsburgh, Pa.

HATCH FASTENERS
Mullholland Hatch-Fastener Co.,
Marion Bldg., Cleveland, O.

HAWSERS (Manila)
Columbian Rope Co., Auburn, N. Y.
Samson Cordage Works, Boston.
Whitlock Cordage Co.,
46 South St., New York City.

HEATERS AND PURIFIERS (Feed Water)
Davis Engineering Co.,
90 West St., New York City.
Griscom-Russell Co.,
285 Madison Ave., New York City.
Westinghouse Electric & Mfg. Co.,
So. Philadelphia, Pa.

HEATING EQUIPMENT
Sturtevant, B. F., Co.,
Hyde Park, Boston, Mass.
Westinghouse Electric & Mfg. Co.,
S. Philadelphia, Pa.

HEATING STOVES
Stamford Foundry Co.,
Stamford, Conn.

HOISTING ENGINES
Hyde Windlass Co., Bath, Me.

HOISTS (Air)
American Shipbuilding Co.,
Foot of W. 54th St., Cleveland.
Ingersoll-Rand Co.,
11 Broadway, New York City

INDICATORS (Direction & Revolution)
Sperry Gyroscope Co., The,
Brooklyn, N. Y.

INDICATORS (Helm Angle)
Sperry Gyroscope Co., The,
Brooklyn, N. Y.

INDICATORS (Speed)
Sperry Gyroscope Co., The,
Brooklyn, N. Y.

ICE MACHINES—See REFRIGERATING MACHINERY

INSURANCE (Marine)
Boland & Cornelius.
Marine Trust Bldg., Buffalo, N. Y.

IRON (Bar)
Wrought Iron Co. of America,
Lebanon, Pa.

IRON (Engine Bolt)
Wrought Iron Co. of America,
Lebanon, Pa.

IRON (Staybolt)
Wrought Iron Co. of America,
Lebanon, Pa.

LAMPS (Mazda and Arc)
General Electric Co.,
Schenectady, N. Y.

LIFEBOATS
Lane, C. M., Lifeboat Co., Inc.,
856 Humboldt St., Brooklyn, N. Y.
Welin Davit & Boat Corp.,
3-5 Vernon Ave.,
Long Island City, N. Y.

LIFESAVING EQUIPMENT
Lane, C. M., Lifeboat Co., Inc.,
856 Humboldt St., Brooklyn, N. Y.

LIGHTING EQUIPMENT
Westinghouse Electric & Mfg. Co.
S. Philadelphia, Pa.

LUBRICATING OIL
Standard Oil Co., of New Jersey,
26 Broadway, New York City.
Vacuum Oil Co.,
61 Broadway, New York City.

MACHINERY (Marine)
American Shipbuilding Co.,
Foot of W. 54th St., Cleveland, O.
Bethlehem Shipbuilding Corp., Ltd.,
Bethlehem, Pa.
Cooper-Bessemer Corp., The,
Grove City. Pa.
Great Lakes Engineering Works.
River Rouge, Mich.
Los Angeles Shipbuilding & Dry Dock Corp., San Pedro, Cal.
Manitowoc Ship Building Corp.,
Manitowoc. Wis.
Maryland Dry Dock Co.,
Baltimore Md.
Toledo Shipbuilding Co., Toledo, O.

MACHINES (Sounding)
Submarine Signal Co.,
160 State St., Boston, Mass.

MACHINISTS
American Shipbuilding Co.,
Foot of W. 54th St., Cleveland, O.
Busch-Sulzer Bros.-Diesel Engine Co., 2nd & Utah Sts.,
St. Louis, Mo.
New York Shipbuilding Co.,
Camden, N. J.

MAGNETS (Lifting)
Cutler-Hammer, Inc.,
1265 St. Paul Avenue,
Milwaukee, Wis.

MANILA OAKUM—See OAKUM (Marine, Rope, Packings, Plumbers)

MARINE RAILWAY BUILDERS
Crandall Engineering Co.,
Cambridge, Mass.

MATERIAL HANDLING EQUIPMENT
Smith, Leathem D., Dock Co.,
Sturgeon Bay, Wis.

MATTRESSES
Simmons Co., The, 666 Lake Shore Drive, Chicago, Ill.

METERS (Gas & Air)
Cutler-Hammer, Inc.,
1265 St. Paul Avenue,
Milwaukee, Wis.

MOTOR GENERATOR SETS
Fairbanks, Morse & Co.,
900 S. Wabash Ave., Chicago, Ill.
General Electric Co.,
Schenectady, N. Y.
Westinghouse Electric & Mfg. Co.,
S. Philadelphia, Pa.

MOTORS (Electric)
Fairbanks, Morse & Co.,
900 S. Wabash Ave., Chicago, Ill.
General Electric Co.,
Schenectady, N. Y.
Westinghouse Electric & Mfg. Co.,
East Pittsburgh, Pa.

NAUTICAL INSTRUMENTS
Ritchie, E. S., & Sons,
Brookline, Mass.
Sperry Gyroscope Co., The,
Brooklyn, N. Y.

NAVIGATING INSTRUMENTS
White, Kelvin & Wilfrid O., Co.,
112 State St.. Boston, Mass.

NITROGEN
Linde Air Products Co.,
30 East 42nd St., New York City

OAKUM (Marine, Rope, Packings, Plumbers)
Stratford, George, Oakum Co.,
165 Cornelison Ave.,
Jersey City, N. J.

OIL BURNING EQUIPMENT
Babcock & Wilcox Co.,
85 Liberty St., New York City.
Bethlehem Shipbuilding Corp., Ltd.,
Bethlehem, Pa.
Sturtevant, B. F., Co.,
Hyde Park, Boston, Mass.

OIL FOR ALL PURPOSES (Marine)
Vacuum Oil Co., 61 Broadway,
New York City.

OXY-ACETYLENE APPARATUS
Oxweld Acetylene Co., The,
30 E. 42nd St., New York City

OXYGEN
Linde Air Products Co.,
30 East 42nd St., New York City.

PAINT BURNERS (Acetylene)
Prestolite Co., The, Inc.,
Auto Gas Div., 30 E. 42nd St.,
New York City

PASSENGER SERVICE
Hamburg-American Line,
39 Broadway, New York City.

PISTON RODS
Heppenstall Co.,
46th & A.V.R.R., Pittsburgh, Pa.

PLATES (Sheared Steel)
Alan Wood Steel Co.,
Conshohocken, Pa.

PLATES (Steel Floor)
Alan Wood Steel Co.,
Conshohocken, Pa.

PORTABLE LIGHTS (Acetylene)
Prestolite Co., The, Inc.,
Auto Gas Div., 30 E. 42nd St.,
New York City

PROPELLER BLADES AND HUBS
Sheriffs Mfg. Co., Milwaukee, Wis.

PROPELLER WHEELS
American Shipbuilding Co.,
Foot of W. 54th St., Cleveland, O.
Great Lakes Engineering Works,
River Rouge, Mich.
Newport News Shipbuilding & Dry Dock Co., 233 Broadway,
New York City.
Sheriffs Mfg. Co., Milwaukee, Wis.
Toledo Shipbuilding Co., Toledo, O.
Trout, H. G Co., 220 Ohio St.,
Buffalo, N. Y.

PROPELLERS
Bethlehem Shipbuilding Corp., Ltd.,
Bethlehem, Pa.
Hyde Windlass Co., Bath, Me.
Newport News Shipbuilding & Dry Dock Co., 233 Broadway,
New York City.

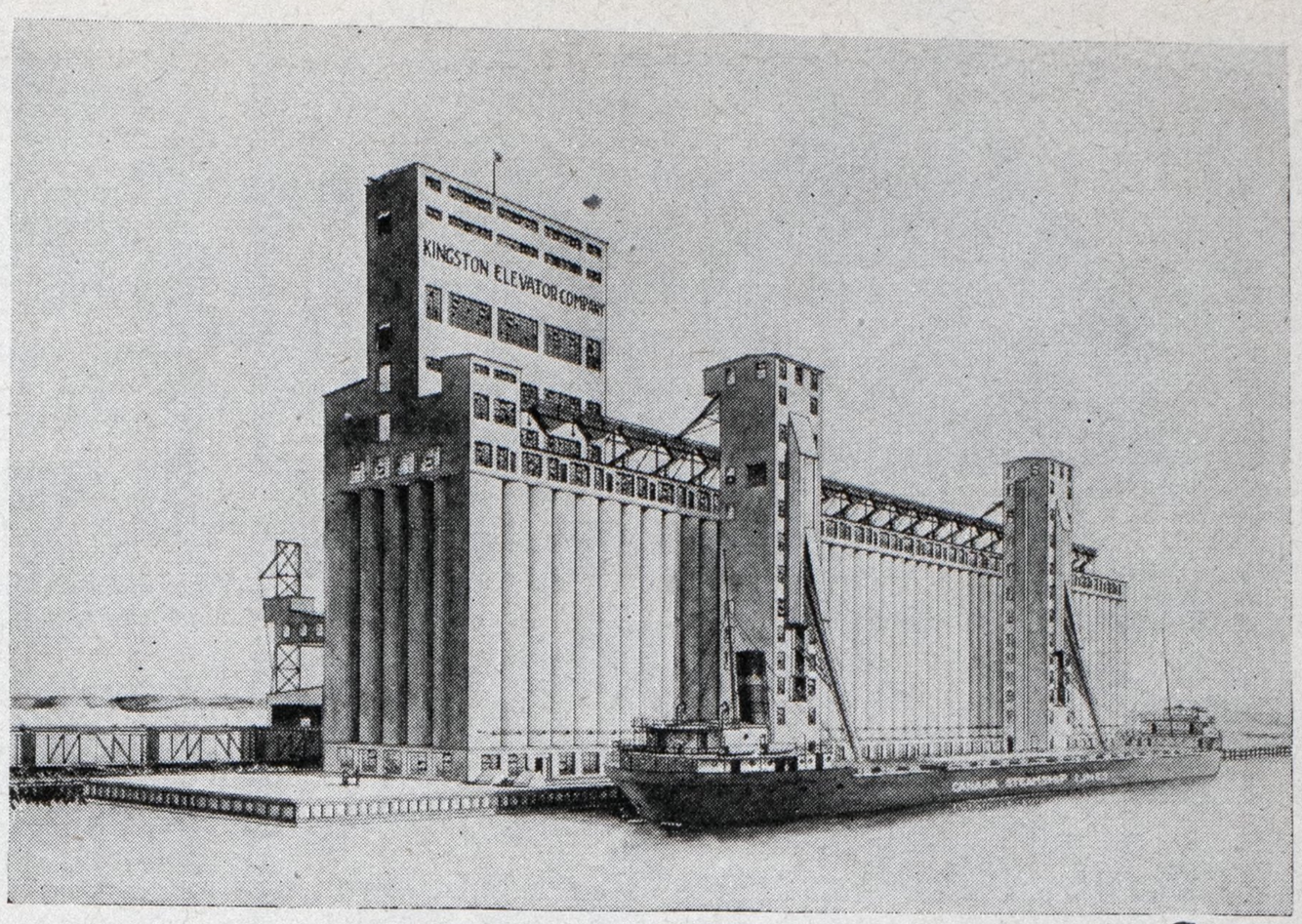
PULVERIZED COAL BURNERS
Todd Shipyards Corp.,
25 Broadway, New York City.

PUMPS
Bethlehem Shipbuilding Corp., Ltd.,
Bethlehem, Pa.
Dean Brothers Co.,
323 W. 10th St., Indianapolis, Ind.
Fairbanks, Morse & Co.,
900 S. Wabash Ave., Chicago, Ill.

See Index to Advertisements for Pages Containing Advertisements of Companies Listed Above

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a new eastern terminal for the Canadian grain trade of the Great Lakes is being created.



The first unit of the new elevator will have a 2½ million bushel capacity. The Kingston Elevator Company is a subsidiary of

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Pennsylvania
Waialeale
Hualalai
Montauk
Montana
Caracas
George Washington
President Harding
Pacific Sun
President Fillmore
Hendrik Hudson
Alexander Hamilton
President Garfield
Morro Castle
Santa Clara
City of New York
Itaska
Sebago
Saranac
etc., etc., etc.

PUMPS—Continued
Great Lakes Engineering Works, River Rouge, Mich.
Ingersoll-Rand Co., 11 Broadway, New York City.

PUMPS (Ballast)
Dean Brothers Co., 323 W. 10th St., Indianapolis, Ind.

PUMPS (Bilge)
Dean Brothers Co., 323 W. 10th St., Indianapolis, Ind.
Fairbanks, Morse & Co., 900 S. Wabash Ave., Chicago, Ill.

PUMPS (Boiler Feed)
Dean Brothers Co., 323 W. 10th St., Indianapolis, Ind.
Fairbanks, Morse & Co., 900 S. Wabash Ave., Chicago, Ill.

PUMPS (Direct Acting)
Dean Brothers Co., 323 W. 10th St., Indianapolis, Ind.

PUMPS (Power)
Dean Brothers Co., 323 W. 10th St., Indianapolis, Ind.
Fairbanks, Morse & Co., 900 S. Wabash Ave., Chicago, Ill.

PUMPS (Steam)
Dean Brothers Co., 323 W. 10th St., Indianapolis, Ind.
Fairbanks, Morse & Co., 900 S. Wabash Ave., Chicago, Ill.

PUMPS (Vacuum)
Dean Brothers Co., 323 W. 10th St., Indianapolis, Ind.

PURIFICATION SYSTEMS—See WATER PURIFICATION SYSTEMS

RADIO COMPASS AND DIRECTION FINDER
Radiomarine Corp. of America, 66 Broad St., New York City.

RADIO EQUIPMENT
Radiomarine Corp. of America, 66 Broad St., New York City.

RAFTS
Lane, C. M., Lifeboat Co., Inc., 856 Humboldt St., Brooklyn, N. Y.

RAILWAY DRY DOCKS
Crandall Engineering Co., Cambridge, Mass.

RANGES
Stamford Foundry Co., Stamford, Conn.

REFRIGERATING MACHINERY
Brunswick-Kroeschell Co., New Brunswick, N. J.
Ingersoll-Rand Co., 11 Broadway, New York City

REPAIRS
Los Angeles Shipbuilding & Dry Dock Corp., San Pedro, Cal.
Maryland Dry Dock Co., Baltimore, Md.

REPAIRS (Electric)
Westinghouse Electric & Mfg. Co., S. Philadelphia, Pa.

REPAIRS (Marine)
American Shipbuilding Co., Foot of W. 54th St., Cleveland.
Bath Iron Works Corp., Bath, Me.
Bethlehem Shipbuilding Corp., Ltd., Bethlehem, Pa.
Canada Steamship Lines, P. O. 2435, Montreal, Can.
Chicago Shipbuilding Co., So. Chicago, Ill.
Collingwood Shipyards, Inc., Collingwood, Ont., Canada.
Great Lakes Engineering Works, River Rouge, Mich.
Manitowoc Ship Building Corp., Manitowoc, Wis.
Newport News Shipbuilding & Dry Dock Co., 233 Broadway, New York City.
New York Shipbuilding Co., Camden, N. J.
Sun Shipbuilding & Dry Dock Co., Chester, Pa.
Todd Shipyards Corp., 25 Broadway, New York City.
Toledo Shipbuilding Co., Toledo, O.
United Dry Docks, Inc., 11 Broadway, New York City

REPAIRS (Marine Engine)
Collingwood Shipyards, Inc., Collingwood, Ont., Canada.
Electric Boat Co.-New London Ship & Engine Works, 247 Park Ave., New York City.

REPAIRS (Turbine)
Westinghouse Electric & Mfg. Co., S. Philadelphia, Pa.

REVOLUTION COUNTERS
Cummings Machine Works, 255 Atlantic Ave., Boston, Mass.
Sperry Gyroscope Co., Manhattan Bridge Plaza, Brooklyn, N. Y.

RIVETS
Wrought Iron Co. of America, Lebanon, Pa.

RINGS (Steel)
Heppenstall Co., 46th & A.V.R.R., Pittsburgh, Pa.

ROLLS (Steel)
Heppenstall Co., 46th & A.V.R.R., Pittsburgh, Pa.

ROPE (Manila, Net, Sisal, and Other Hard Fiber Cordage)
Columbian Rope Co., Auburn, N. Y.
Samson Cordage Works, Boston.
Whitlock Cordage Co., 46 South St., New York City.

ROPE (Transmission)
Columbian Rope Co., Auburn, N. Y.

ROPE OAKUM
Stratford, George, Oakum Co., Jersey City, N. J.

RUBBER TILE
Selby, Battersby & Co., 33rd & Arch Sts., Philadelphia.

RUST PREVENTATIVE (Oil)
Vacuum Oil Co., 61 Broadway, New York City.

SAFETY VALVES (Marine)
Star Brass Mfg. Co., 53 Oliver St., Boston, Mass.

SCHOONERS (Auxiliary)
American Shipbuilding Co., Foot of W. 54th St., Cleveland.
Toledo Shipbuilding Co., Toledo, O.

SEARCHLIGHTS (High Intensity)
Sperry Gyroscope Co., The, Brooklyn, N. Y.

SEARCHLIGHTS (Incandescent and Arc)
General Electric Co., Schenectady, N. Y.
Sperry Gyroscope Co., The, Brooklyn, N. Y.

SELF UNLOADING EQUIPMENT
Smith, Leathem D., Dock Co., Sturgeon Bay, Wis.

SEPARATORS (Oil)
Babcock & Wilcox Co., 85 Liberty St., New York City.

SHEAR BLADES & KNIVES
Heppenstall Co., 46th & A.V.R.R., Pittsburgh, Pa.

SHEETS (Blue Annealed)
Alan Wood Steel Co., Conshohocken, Pa.

SHIPBUILDERS
American Shipbuilding Co., Foot of W. 54th St., Cleveland.
Bath Iron Works Corp., Bath, Me.
Bethlehem Shipbuilding Corp., Ltd., Bethlehem, Pa.
Canada Steamship Lines, P. O. Box 2430, Montreal, Can.
Collingwood Shipyards, Inc., Collingwood, Ont., Canada.
Great Lakes Engineering Works, River Rouge, Mich.
Los Angeles Shipbuilding & Dry Dock Corp., San Pedro, Cal.
Manitowoc Ship Building Corp., Manitowoc, Wis.
Maryland Dry Dock Co., Baltimore, Md.
Newport News Shipbuilding & Dry Dock Co., 233 Broadway, New York City.
New York Shipbuilding Co., Camden, N. J.
Smith, Leathem D., Dock Co., Sturgeon Bay, Wis.
Sun Shipbuilding & Dry Dock Co., Chester, Pa.
Todd Shipyards Corp., 25 Broadway, New York City.
Toledo Shipbuilding Co., Toledo, O.
United Dry Docks, Inc., 11 Broadway, New York City.

SHIPBUILDING SYSTEMS
Isherwood, J. W., & Co., Ltd., 17 Battery Place, New York City.

SHIP STABILIZERS
Sperry Gyroscope Co., The, Brooklyn, N. Y.

SIGNALS (Submarine)
Submarine Signal Co., 160 State St., Boston, Mass.

SOLDERING IRONS (Acetylene)
Prestolite Co., The, Inc., Auto Gas Div., 30 E. 42nd St., New York City

SOUNDING MACHINES
Submarine Signal Co., 160 State St., Boston, Mass.

SPRINGS (Box, Bed)
Simmons Co., The, 666 Lake Shore Drive, Chicago, Ill.

SPUN OAKUM
Stratford, George, Oakum Co., Jersey City, N. J.

STEAMSHIP COMPANIES (Lake Passenger & Freight)
Cleveland & Buffalo Transit Co., The, E. 9th St., Pier, Cleveland, O.

STEAMSHIP LINES (Passenger and Freight)
Hamburg-American Lines, 39 Broadway, New York City.

STEAM GAGES
Star Brass Mfg. Co., 53 Oliver St., Boston, Mass.

STEAM TRAPS
Davis Engineering Co., 90 West St., New York City.

STEEL (Electric Induction)
Heppenstall Co., 46th & A.V.R.R., Pittsburgh, Pa.

STEEL BARGES—See BARGES (Steel)

STEEL TANKS
Brunswick-Kroeschell Co., New Brunswick, N. J.

STEERING ENGINES
Hyde Windlass Co., Bath, Me.

STEERING GEARS
American Shipbuilding Co., Foot of W. 54th St., Cleveland.
Bethlehem Shipbuilding Corp., Ltd., Bethlehem, Pa.
Hyde Windlass Co., Bath, Me.

STORAGE BATTERIES—See BATTERIES

STOVES
Stamford Foundry Co., Stamford, Conn.

SWITCHBOARDS
General Electric Co., Schenectady, N. Y.
Westinghouse Electric & Mfg. Co., S. Philadelphia, Pa.

TANKS (Acetylene Gas)
Prestolite Co., The, Inc., Auto Gas Div., 30 E. 42nd St., New York City

TELEMOTORS
Hyde Windlass Co., Bath, Me.

TORSION METERS
Cummings Machine Works, 255 Atlantic Ave., Boston, Mass.

TOWING
Moran Towing & Transportation Co. 17 Battery Place, New York City.

TOWING LINES
Columbian Rope Co., Auburn, N. Y.
Whitlock Cordage Co., 46 South St., New York City.

TRACTORS
Clark Tructractor Co., Battle Creek, Mich.
Elwell-Parker Electric Co., The, 4205 St. Clair Ave., Cleveland, O.

TRANSMISSION (Rope)—See ROPE (Transmission)

TREADS (Steel Stair & Ladder)
Alan Wood Steel Co., Conshohocken, Pa.

TRUCKS
Clark Tructractor Co., Battle Creek, Mich.
Elwell-Parker Electric Co., The, 4205 St. Clair Ave., Cleveland, O.

TURBINES (Electric)
General Electric Co., Schenectady, N. Y.
Westinghouse Electric & Mfg. Co., So. Philadelphia, Pa.

TURBINES (Marine)
Bethlehem Shipbuilding Corp., Ltd., Bethlehem, Pa.
Newport News Shipbuilding & Dry Dock Co., 233 Broadway, New York City.
Westinghouse Electric & Mfg. Co., So. Philadelphia, Pa.

TURBINES (Steam)
DeLaval Steam Turbine Co., Trenton, N. J.
Newport News Shipbuilding & Dry Dock Co., 233 Broadway, New York City.
Sturtevant, B. F., Co., Hyde Park, Boston, Mass.
Westinghouse Electric & Mfg. Co., So. Philadelphia, Pa.

TWINE AND ROPE
Columbian Rope Co., Auburn, N. Y.
Samson Cordage Works, Boston.
Whitlock Cordage Co., 46 South St., New York City.

VALVES AND FITTINGS
Bethlehem Shipbuilding Corp., Ltd., Bethlehem, Pa.

VENTILATING EQUIPMENT
Sturtevant, B. F., Co., Hyde Park, Boston, Mass.

WATER PURIFICATION SYSTEMS
Griscom-Russell Co., 285 Madison Ave., New York City.

WELDERS (Electric Arc)
Westinghouse Electric & Mfg. Co., S. Philadelphia, Pa.

WELDING & CUTTING APPARATUS (Oxy, Acetylene, Oxy-Gas)
Oxweld Acetylene Co., The, 30 E. 42nd St., New York City

WELDING GAS
Prestolite Co., The, Inc., 30 E. 42nd St., New York City

WELDING SUPPLIES
Oxweld Acetylene Co., The, 30 E. 42nd St., New York City

WHISTLES
Star Brass Mfg. Co., 53 Oliver St., Boston, Mass

WINCHES
Bethlehem Shipbuilding Corp., Ltd., Bethlehem, Pa.
Dake Engine Co., Grand Haven, Mich.
Hyde Windlass Co., Bath, Me.

WINDLASSES
American Shipbuilding Co., Foot of W. 54th St., Cleveland.
Bethlehem Shipbuilding Corp., Ltd., Bethlehem, Pa.
Dake Engine Co., Grand Haven, Mich.
Hyde Windlass Co., Bath, Me.

WIRELESS MESSAGE SERVICE
Radiomarine Corp. of America, 66 Broad St., New York City.

WIRELESS SETS AND APPARATUS
Radiomarine Corp. of America, 66 Broad St., New York City.

WORKBOATS
Lane, C. M., Lifeboat Co., Inc., 856 Humboldt St., Brooklyn.

See Index to Advertisements for Pages Containing Advertisements of Companies Listed Above

LANE LIFEBOATS

WERE SUPPLIED TO THE

BYRD ANTARCTIC EXPEDITION

C. M. Lane Lifeboat Co., Inc.
Brooklyn, N. Y.



ANDREW J. MORSE & SON, Inc.
221 High Street BOSTON, MASS.
Established 1837

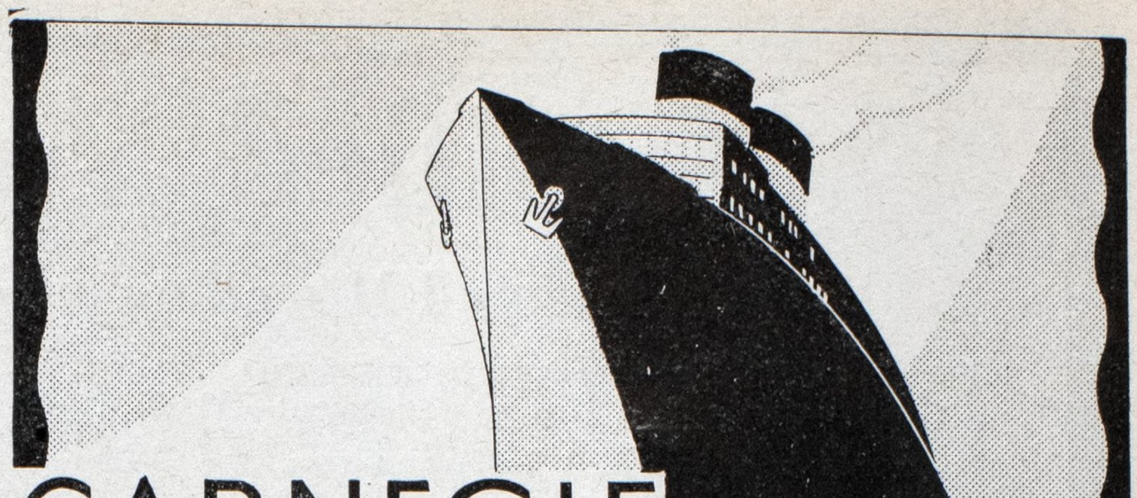
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Callahan Shut-Off Nozzle

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Floorcrafters
Wilford Bldg., 33rd and Arch Sts. Phila., Pa.



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The name "Carnegie" has been identified with steel manufacture for nearly three-quarters of a century—a good name to look for on Steel.

CARNEGIE STEEL COMPANY
Subsidiary of United States Steel Corporation
PITTSBURGH, PA.

62

Self-Unloading Boats our Specialty ----
Self Propelled and Self Unloading River Boats

Wood and Steel Repair Work



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STURGEON BAY, WISCONSIN

Vessel and Insurance Agents

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BUFFALO
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John J. Boland Adam E. Cornelius

BOLAND & CORNELIUS
VESSEL OWNERS AND BROKERS
Marine Insurance Agents
Marine Trust Building BUFFALO, N. Y.



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Established 1854
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Boiler Repairing Promptly Attended to Day or Night
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Works: 36-40 Illinois Street - BUFFALO, N. Y.

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Tugs
Fully Equipped
Low Prices

The Case Fish Co.
Cleveland, Ohio

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5-6 cylinder Busch Sulzer 450/500 BHP, 410 RPM, non reversible. Ideal for Diesel Electric Drive. Can be made reversible. Price $3500.00 each.

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FOR SALE:—S. S. SPORT, AUTOMOBILE Ferry, Side Wheeler, Length 90'1", Beam 24 Ft., Capacity 8 cars. Apply to W. Bingley & Son, Ltd., Cornwall, Ont., Canada.

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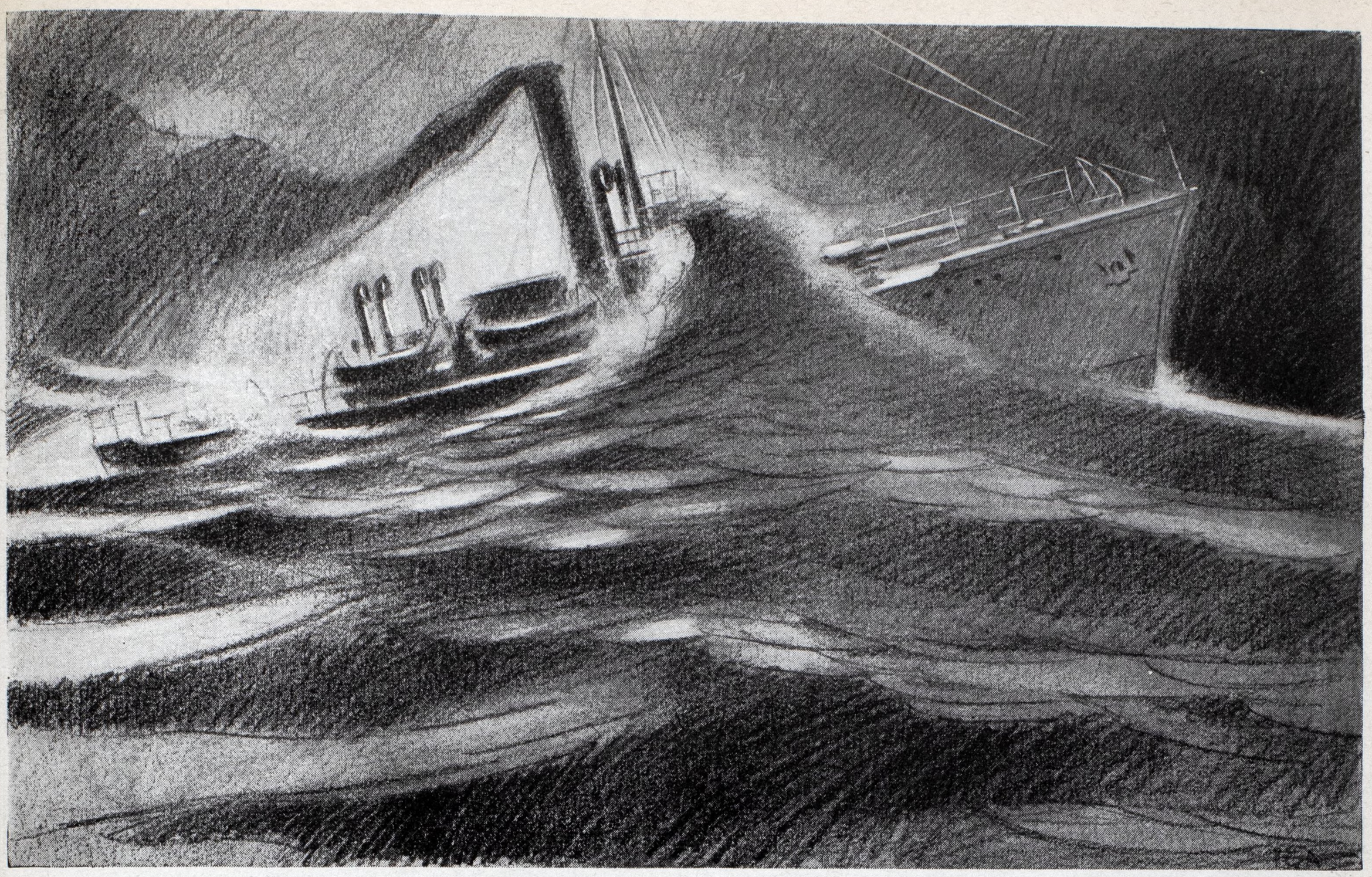
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One of a series of advertisements telling of Westinghouse marine achievements that, measured by the inevitable yardstick of progress, comprise stirring chapters in — A Saga of the Sea

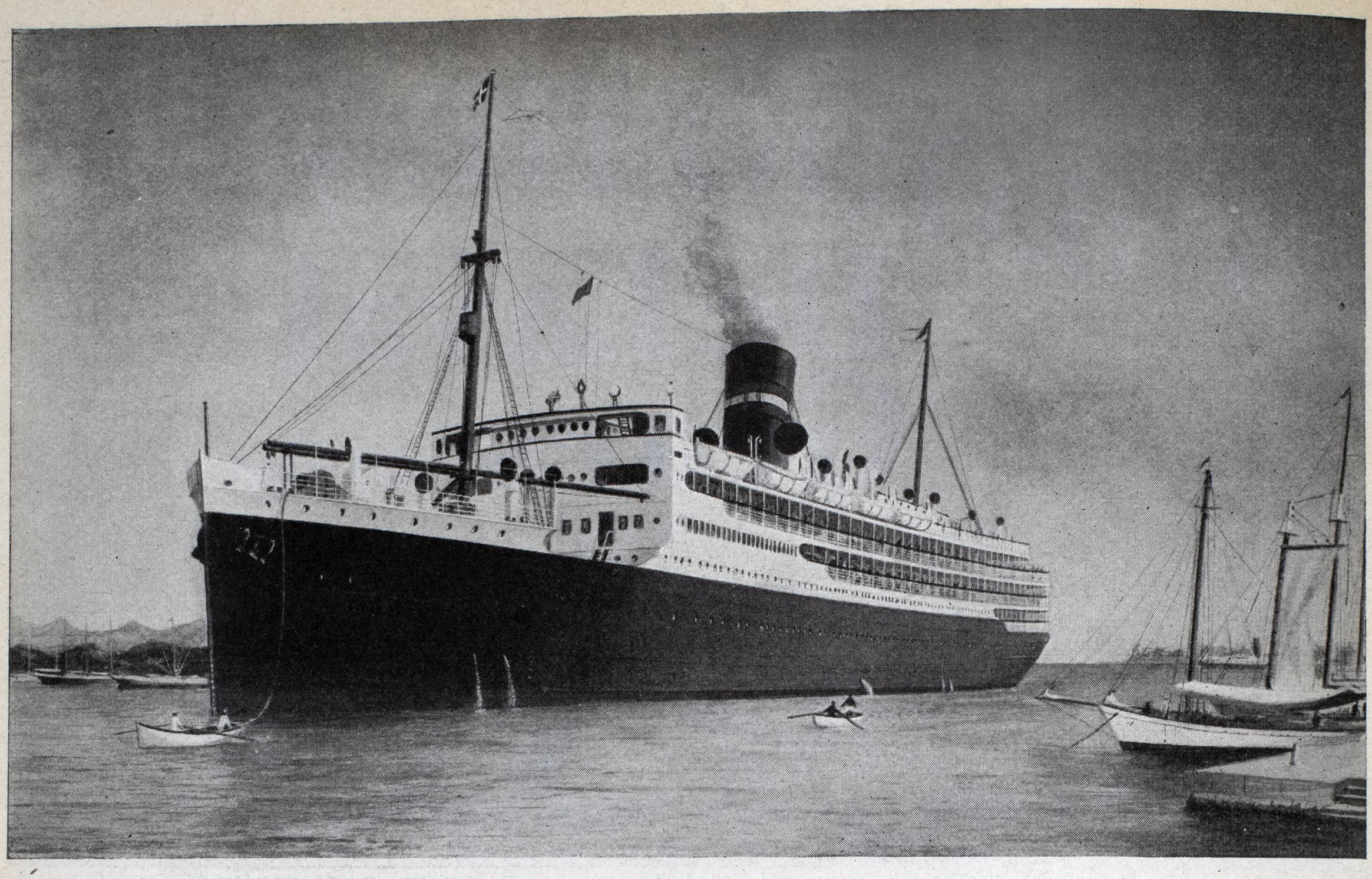
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The operation of De Laval reduction gears in naval vessels, totaling over 2,000,000 H. P., has been characterized by high efficiency and excellent mechanical operation.

All De Laval marine reduction gears are exceedingly quiet in operation.

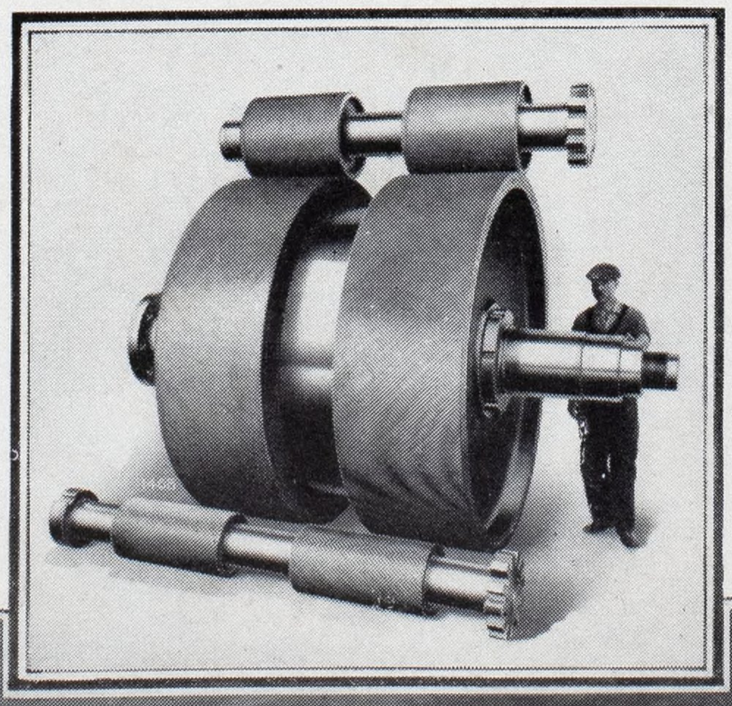
De Laval geared marine turbines will successfully solve propulsion problems.

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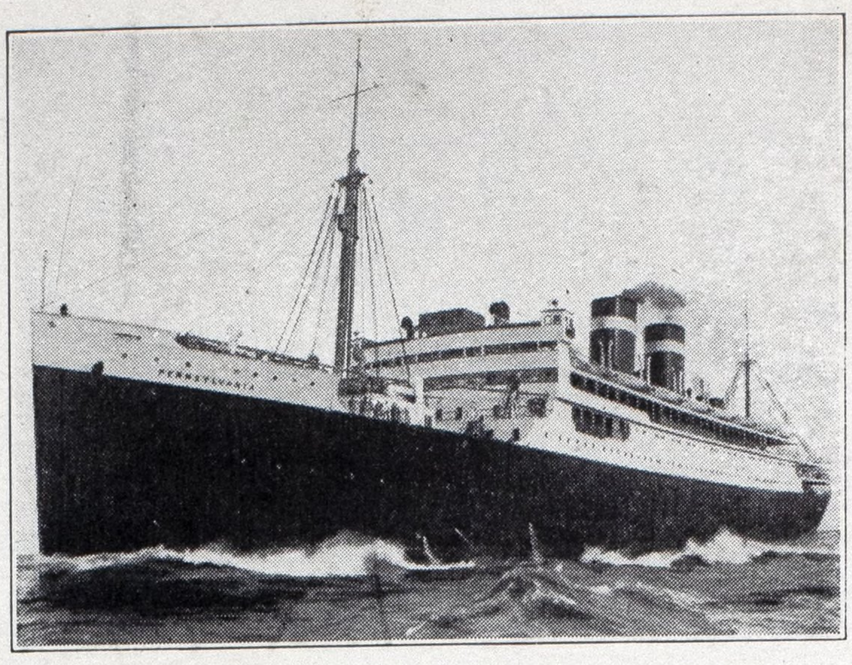
The fuel consumption of existing marine reciprocating engine installations can be reduced from 20% to 25% or the power increased from 20% to 25% without increase in fuel consumption by the use of the "BAUER WACH" system.

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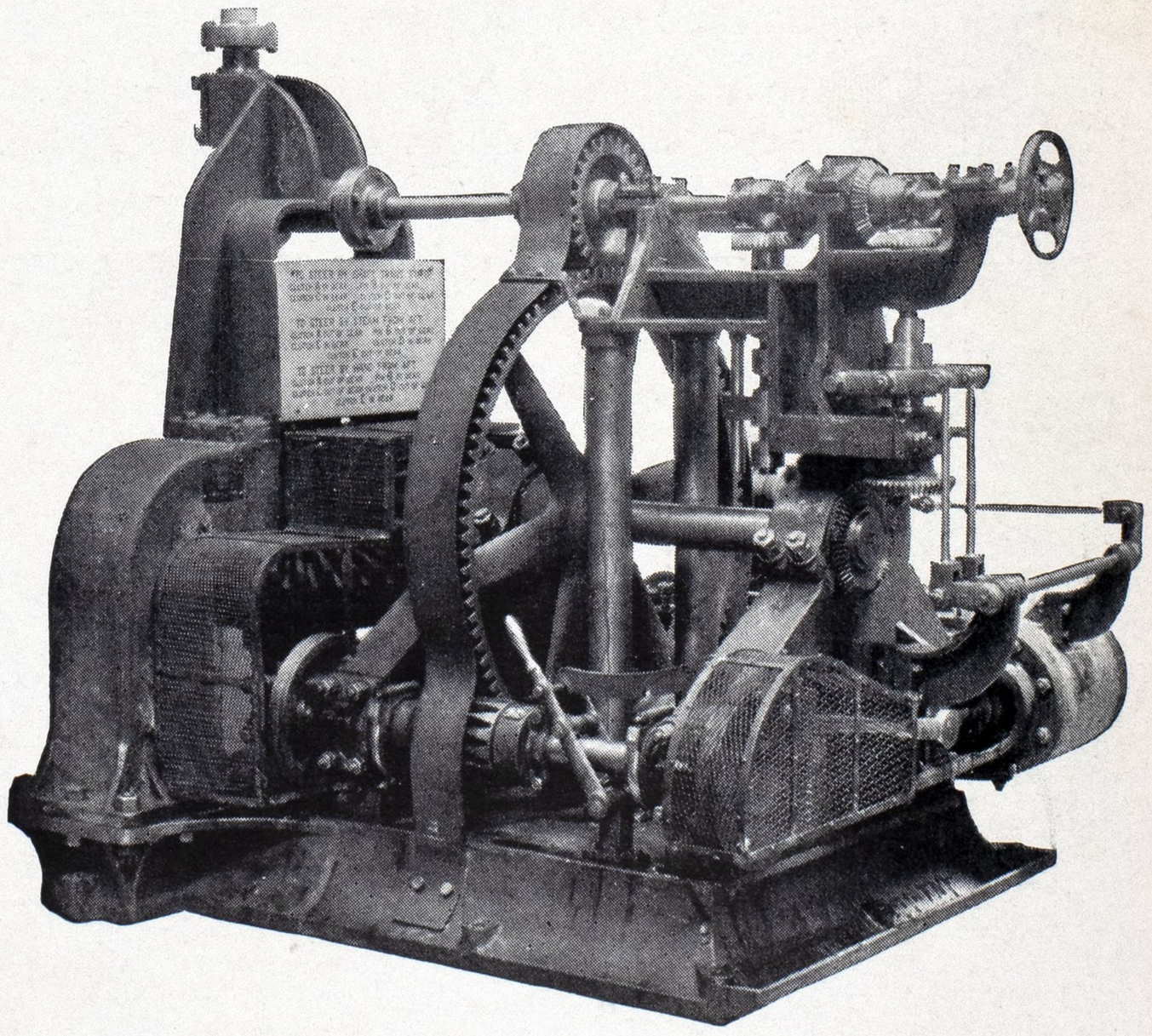
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